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VOLUME XXII | ESTABLISHED 1914 | NUMBER 2

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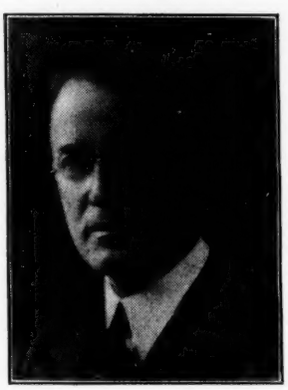

Benjamin T. Brooks, University of Goettingen, served two years with the Bureau of Standards and three with the Philippine Bureau of Science; did research work for the Gulf Refining Co., Mellon Institute, and was Chief Chemical Engineer, Mathieson Alkali Works 1919-24; since which time in private consulting practice; chairman of the Petroleum Committee, National Research Council; saw service on the Mexican Border and is Major in C. W. S., and Fellow of the Chemical Society, and the author of "Non-Benzenoid Hydrocarbons."

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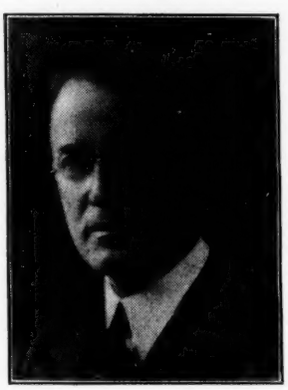

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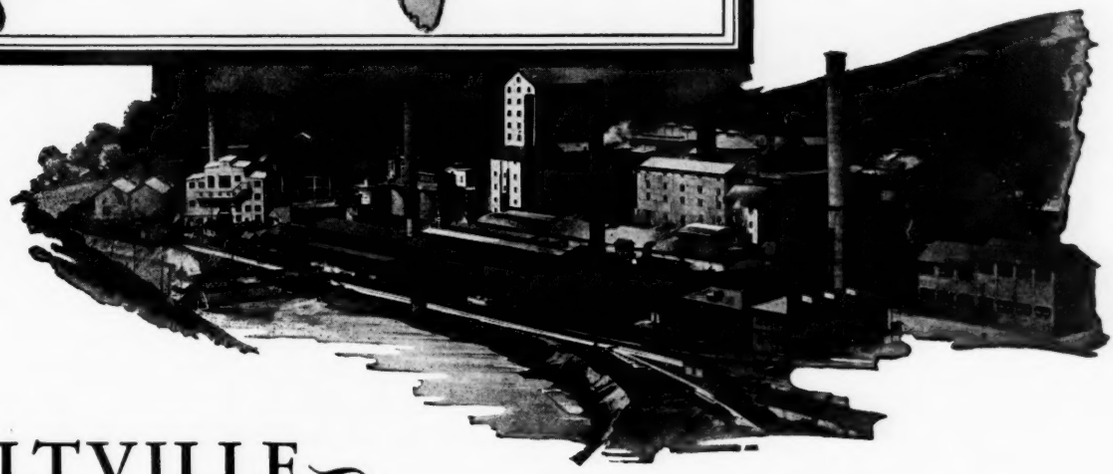
Saltville, Virginia, plant of The Mathieson Alkali Works (Inc.)—located at one of the most extensive deposits of salt in the South. Saltville is served by the Norfolk and Western Railway, southward to Bristol, (Va.—Tenn.), Winston-Salem and Durham, eastward to Norfolk, northward to Hagerstown, and westward to Cincinnati and Columbus, with through connections to all points via the Southern Railway, Atlantic Coast Line, Baltimore & Ohio, Pennsylvania, Chesapeake & Ohio, Louisville & Nashville, Seaboard Air Line and their connections.



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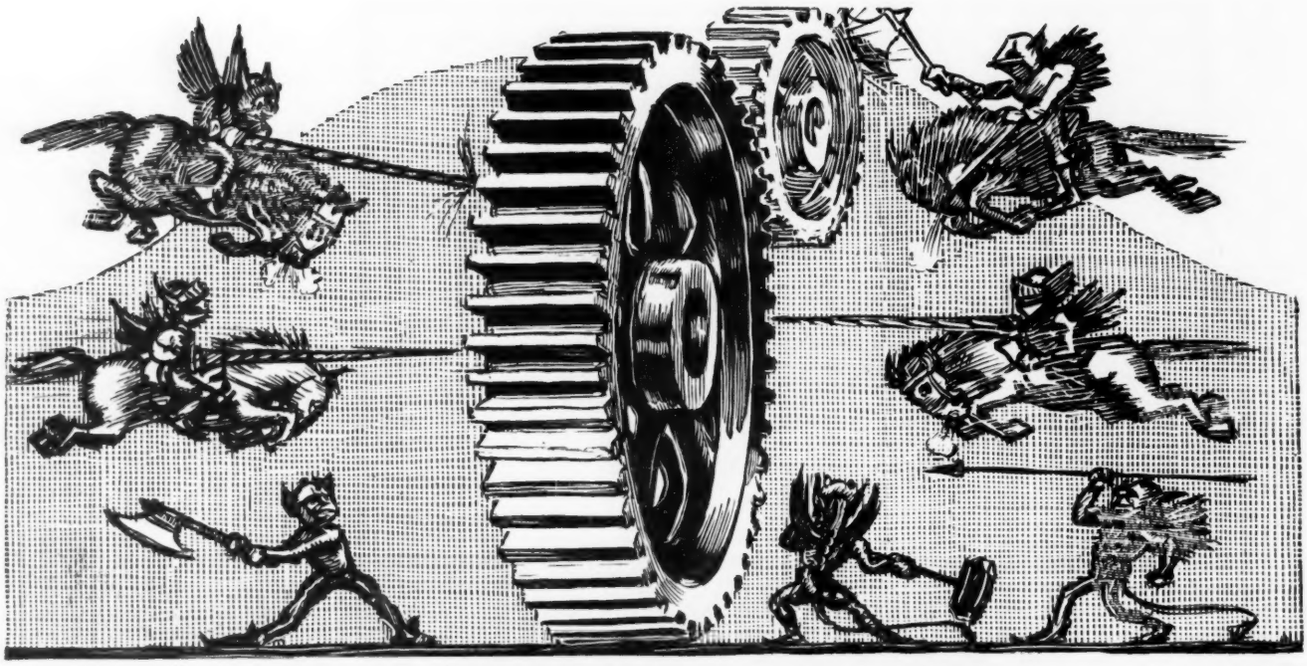

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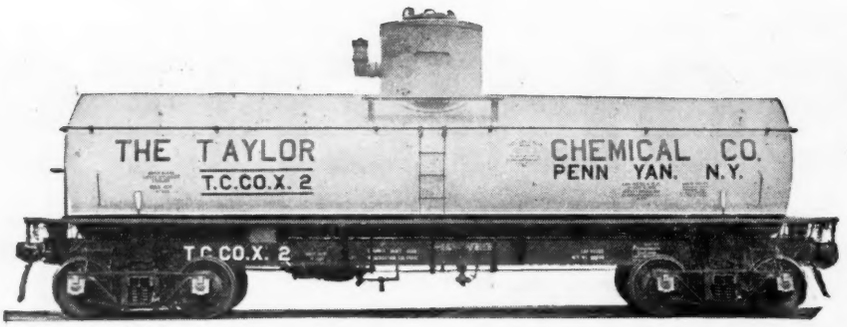

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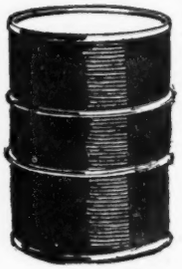

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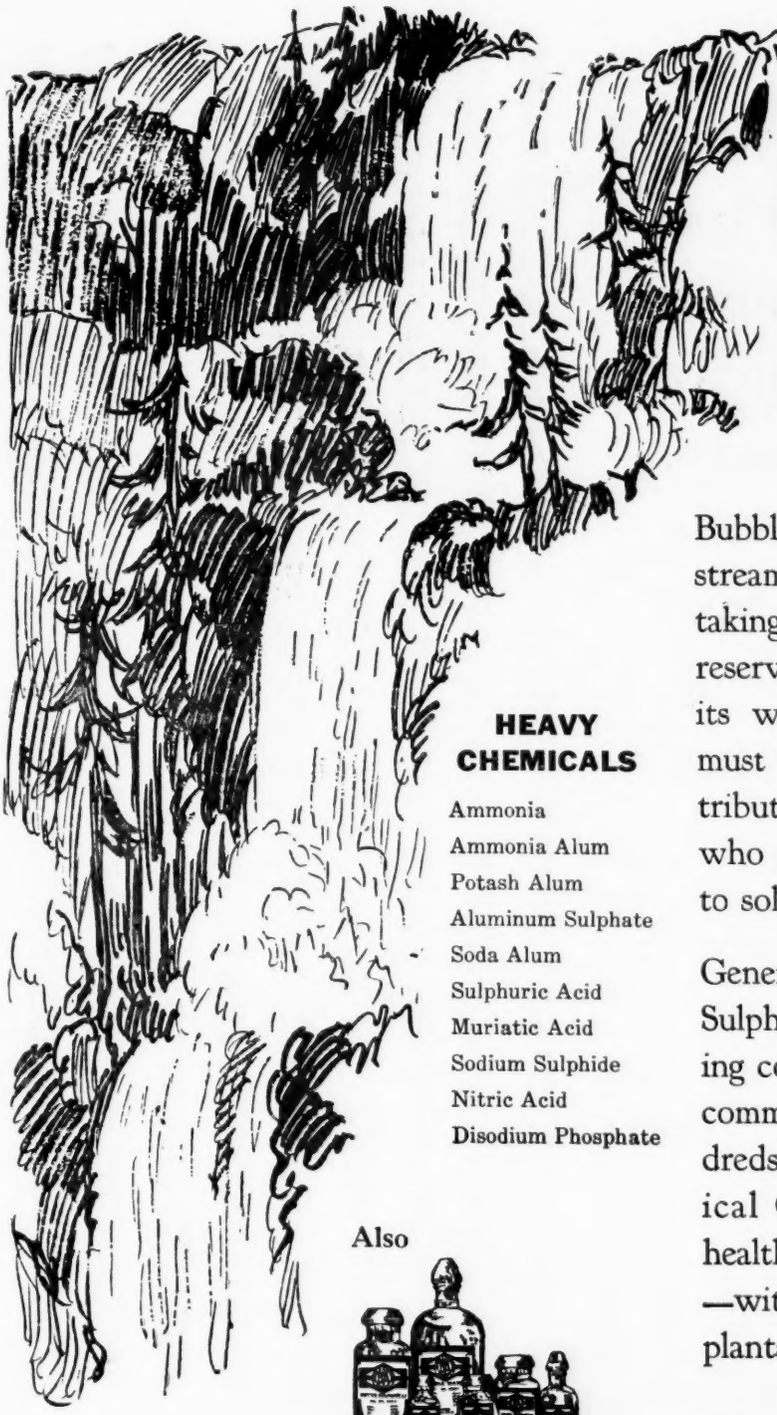

Even the Waterfall has its Chemical Treatment

Bubbling spring, babbling brook, rushing stream dashing over a cliff in a breath-taking plunge—finally to lose itself in the reservoir that supplies a city. All along its way, it gathers impurities—which must be removed before it can be distributed as healthful water to the people who rely upon it. And chemicals help to solve this problem of purification.

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Coast to Coast Producing Points

CHEMICAL MARKETS

VOL. XXII. FEBRUARY, 1928 NO. 2.

Bonds and Test Tubes

A VERITABLE witches brew of cartel rumors has been dished up during the past month. Berlin, London, Paris, Washington, and New York have all contributed their spicy ingredients.

THE I. G.—to pick the biggest bone in the pot—has been successively reported to be building plants in the United States to make (a) nitrates, (b) synthetic ethyl alcohol (c) films and photographic chemicals (d) rayon (e) dyes: to have bought a controlling, or at least compelling, interest in (a) the Du Pont (b) the Allied interests (c) Grasselli Chemical Co, (d) Ansco, and (e) Sterling Products; to have entered into a research and marketing alliance with the du Ponts and/or the Allied; to have called and not to have called a nitrate convention; to have broken off negotiations with the I. C. I.; to have allied with a Belgian cartel whose very existence is denied in Brussels; to have concluded arrangements with Kuhlmanns.

IN this rich stew of gossip it is possible to find a few facts. At Frankfort on January fourteenth over two hundred I. G. stockholders, representing it is said some 700,000,000 of the 900,000,000 marks capital authorized a loan of 250,000,000 marks and the issue of 60,000,000 additional 6% preferred stocks. At this meeting Herr Duisberg announced that a dividend of 12% could be declared on the common stock. Although the terms of these new issues and this neat dividend promise were reported on most financial pages few noticed that both preferred stock and proposed bonds will carry rights of transfer to common stocks, nor have followed this thought to the conclusion that any common dividends markedly above 6% should sooner or later transfer both bonds and preferred stock into common share holdings.

SUCH financing confirms the repeated statement that the I. G. has no intention of floating loans abroad, nor, do they intend to extend operations in the United States except by the means of American capital invested in the common stock of such enterprises. The financial facts of their negotiations—notably the Standard Oil—Bergius deal—are carefully guarded secrets; but they are shrewd bargainers and adept at using other people's money. We hear much of their chemical prowess, and while there are hitches in the organization of a pan-European chemical cartel, nevertheless, there is as much financial as chemical genius behind this organization, and they are getting volumes of publicity both technical and financial which, if not always friendly, is always favorable to re-creating the impression of German chemical supremacy.

Bought or Sold

Four chemical sales executives at lunch recently raised the question: "Does a purchaser buy chemicals or is he sold ?"

This is not an original problem. It is one that has been receiving a good deal of attention in a number of different fields recently where there is a growing belief that the average buyer has already made up his mind to purchase long before the actual time of the sale to him takes place. In the case of chemicals, which are industrial raw materials essential for the operation of a plant, it is basically true that the purchasing agent knows that, if the production program is to be maintained, he will require so many carloads of caustic soda, so many kegs of dyestuffs, or so many carboys of sulfuric acid during the next twelve months. Obviously there can be no selling of chemicals in any similar sense to that applicable to the sale of personal goods. The buying of these supplies is an industrial necessity. As is well known, in the purchase of goods for re-manufacture, the element of price is usually the most important single factor of consideration. Again in the case of chemicals this is especially true since most chemicals, even in their commercial grades, are well standardized as to quality.

As a result of these considerations, one of those sales executives has determined next contract season to conduct a selling experiment. He is convinced that his company being well known and thoroughly established as to reputation, the only questions the buyer wants answered are those connected with delivery and prices. He plans to convey this information to buyers in a certain restricted territory not through a salesman, but more quickly and more directly and at less expense by means of the mail, the telegraph, and the telephone. He is convinced, at least to the point of actual trial, that by saving the buyer time and serving his convenience by this more direct method, he will offset any loss that might be sustained through lack of personal contact and the persuasive powers of the individual salesman.

This is an interesting experiment. If it is successful, it will mean revolutionary changes in the distribution of chemicals.

Alcohol Restrictions

Restrictions have indeed become the order of the day in the industrial alcohol industry. For many a long year the producers have been hardened to the habit of operating with their hands tied by all sorts of regulations. Long before the Volstead Law and its tangle of orders and decrees, bonds and reports, inspectors and auditors, they had excise laws and denaturing rules. But of late restriction has been out-Heroding Herod with a vengeance.

Dr. Doran has restricted production. Jack Frost by his untimely absence has restricted demand in the anti-freeze market. Now President Machado restricts the output of Cuban sugar, thus curtailing the supply of Cuban molasses.

Market-wise this latest restriction would appear to be the most significant. If the Cuban sugar crop restriction decree, signed by the President on January 20th, is as successful as last year's law, there is indeed small prospect of lower molasses prices. The new law cuts the distribution to 4,000,000 tons, plus a 250,000 tons carry-over, the molasses from which is fairly presumed to have been shipped at the prices of the late 1927 delivery. Now 4,000,000 tons of sugar means (taking the average yield figures) some 160,000,000 gallons of blackstrap, to be converted into 6,500,000 gallons of alcohol. Since three-fourths of our alcohol output is from molasses —surely half of it from Cuban molasses—the difference between 6,500,000 gallons and half of the Doran maximum production of 80,000,000 gallons represents in a simple arithmetical way the bullish factor on alcohol prices.

The daily papers and some of the minor officialdom of Washington have worked themselves up into a pretty lather over the restriction of our supply of sugar from Cuba to something like 7% less than the past five year's average. That 7% is a paltry fraction of the restriction put by the Cuban Sugar Commission on our normal demands for molasses. Market prophecy is at best foolhardy, and in the case of the alcohol market, where legal rather than economic forces so often rule supreme, it verges dangerously on idiocy—nevertheless, these figures are extremely significant to consumers.

Import Pools

One who senses the trend of sentiment in Washington cannot but be struck by the changed attitude on the part of the Government towards the much maligned big business. This transformation began during the War. The Webb-Pomerene Act was a direct exception to the operation of anti-trust legislation and a score of different Government bureaus have been very active in helping various trade associations to solve competitive problems in

ways which former administrations would certainly have forbade. Even the Federal Trade Commission is confining its activities more and more exclusively to unfair competition arising from misrepresentation and to efforts to control prices.

The latest move in this direction is the introduction of the so-called Newton Bill (H. R. 8927) which authorizes the formation of buying associations among American firms for the importation of raw materials without prosecution for violation of the Sherman and Clayton laws. The hearings before the House Committee on Judiciary held lately in consideration of this proposed legislation throw an extremely interesting side-light on the readjustment in official thought. One would hardly have suspected a few years ago that the Secretary of Agriculture would have come out openly in favor of buying pools of manufacturers of whatever kind; but Secretary Jardine hailed the proposed law as "based upon sound principles" and he frankly admits "the necessity of removing any possible legal barrier to the employment of certain appropriate economic weapons." In fact, Mr. Jardine went further than this and specifically mentioned potash, nitrates, methanol and iodine—to mention only the chemical products —as being controlled by monopolies which could only successfully be fought by concentrated American buying even, if necessary, in defiance of our anti-trust legislation. Because of his position as a champion of the agricultural interests of the country, so friendly and sympathetic an understanding of some problems of the country's industries is particularly noteworthy. If the Department of Agriculture has come so far, it is easy to guess the official attitude of the Departments of Treasury and Commerce.

These are, we take it, hopeful signs. We are living, since the War, in a new economic era and while we do not yet know what the outcome of the economic tendency towards consolidations may be, nevertheless we cannot run counter to the economic current even if we do not always know in what direction that current may be sweeping us.

Bon Voyage !

Nothing but the heartiest of good wishes accompany Samuel Isermann in his command of the recently launched consolidation, the Chemical & Dye Corporation. Already we have a new generation in our dye industry who knew not the scrambling, struggling days of the war period, and who do not realize that this quiet, little man with his prodigous capacity for hard work was one of the true pioneers, his Chemco dyes having first appeared on the market in 1915. Let us all remember too, that his whole-hearted devotion to the industry, during the feverish weeks when the Fordney Tariff Bill was so bitterly attacked, did much to convince wavering Congressmen that the coal-tar rates were not a wicked conspiracy on the part of a couple of big chemical companies to mulct the favorite textile interests and the dear public. Dr. Isermann was the shining example of the smaller dyestuff manufacturer, and he paid dearly for neglecting his own business interests for the general cause of the industry. He richly deserves his reward. Both in colors and in synthetic aromatics he has made signal contributions to the establishment and upbuilding of the American coal-tar chemical industry.

Bridging The Gap

What may be expected in the way of revolutionary changes in the chemical industry is perhaps better forecast in the patent literature of the world than in any other manner.

While this fact is quite generally recognized by all progressive executives, both technical and commercial, it is also a fact that owing to the many difficulties militating against a successful introduction of a patent checking system into the average chemical organization, an attitude of "let George do it" has developed among many of our executives, considered progressive in most respects, but admittedly lax in this cardinal necessity of keeping abreast of modern developments. A few of the difficulties encountered in maintaining a check-up on patents are the initial cost of subscription of gazettes from all important countries, inability to have expedient translation from at least five foreign languages and the time expended in selecting the chemical from the non-chemical items.

However, there is no longer reason for neglecting to be posted on patent literature. The Bureau of Economic Chemistry has successfully surmounted the difficulties enumerated above and is now rendering a thrice weekly service of all chemical and related patent literature from the principal countries of the world, translated into English, arranged alphabetically, and delivered to you at a cost below the initial price of these foreign patent gazettes.

They Say:——

At the present time the demand for raw products is greater than ever before, and we are feverishly digging copper, oil and coal from the bowels of the earth, growing cotton and wool, starch and sugar, cutting down forests of trees to make paper, and generally proceeding with the excavation and denudation of the earth, but none of these industries, save perhaps the growing of food, can be regarded as permanent and unthreatened.—*C. E. K. Mees.*

The chemical industry, due to combinations, can manufacture so cheaply that it can export with profit in spite of duties imposed by other countries. Germany has made great progress in the standardization of methods of production. As compared with American methods, the German aim is to produce and then to sell.—*Dr. Felix Deutsch.*

The prestige of the chemical industry at the present moment stands high, and is not lessened by comparison with the condition of some of the country's other basic industries. It appears, in fact, to be offering a lead not only in research, but also in wider industrial questions.—*L. J. Hooley.*

The results of research have a vitally important bearing upon the physical welfare and happiness of the average man because to-day's discoveries in the research laboratory are to-morrow's products and the processes for making them.—*Dr. C. N. A. Stine.*

From the action of Allied Chemical, one might say traders have forgotten the foreign chemical combination that was to do all kinds of things to American competitors.—*Wall Street Journal. 1-11-28.*

Competitive strength is tending away from good personality in the sales representative, valuable as that is, and more toward lower costs and process, and good quality in the product.—*Industrial Digest.*

"The old adage to the effect that necessity is the mother of invention was never more truly applied than in the relation of chemical engineering to that of the chemical industries.—*Sidney J. Tungay.*

Great industries result more from an evolution of original ideas than from an accumulation of capital.—*B. F. Walker, Industrial Digest.*

Chemistry has taken its rightful place as one of the most important of man's activities.—*Chem. Age.*

"Personal integrity can no longer be relied upon to keep business in the straight path since personal relations are now often impossible. Definite standard. of practice must be established, rules of conduct must be formulated to safeguard both buyer and sellers This is a job for business itself."—*Alvin E. Dodd, U. S. Chamber of Commerce.*

In its broadest embrace—colloidal, catalytic, biological, therapeutic, and what not—chemistry is the moving principle of this world of ours. It is nothing less than life and death!—*George D. Rosengarten.*

Science in general has needed an interpreter to translate it into the terminology of the man on the street, and that is one of the great functions of industrial research.—*C. F. Kettering.*

No other industry probably has done so much to raise the standard of living as the chemical industry and consequently no other industry is developing to the same degree.—*A. H. Swift.*

I am a great friend of analysis, "Why" and "How" are such useful questions that they cannot be uttered too often—*Napoleon.*

It is the business of science to predict.—*Herbert Spencer.*

Ten Years Ago

(From "Drug and Chemical Markets" February 1918)

President Wilson signs order authorizing construction of power dam at Muscle Shoals, Ala., as part of $60,000,000 project for government plant there for fixation of atmospheric nitrogen for use in manufacture of munitions and fertilizer.

Federal Trade Commission charges 38 varnish and ink concerns with unfair methods of competition in violation of Section five, Federal Trade Commission Act.

New Jersey Zinc Co. reports net income for quarter ended Dec. 31, 1917, of $3,926,428, which compares with $7,297,051 for same period of previous year.

Atlas Powder Co., acting for United States Government, begins construction of $6,000,000 nitrate of ammonia plant near Perryville, Md.

Aetna Explosives & Chemical Co. plans construction of $500,000 plant at Huntington, Pa., to manufacture dyes and chemicals.

General Chemical Co. reports net profits for 1917 of $7,671,181 which compares with $9,695,181 for previous year.

Du Pont Powder Co.'s Carney's Point Works burns causing estimated damage of $250,000.

William S. Gray & Co. advances price denatured alcohol to 73 cents per gallon in carloads.

Du Pont Chemical Works begins deliveries of synthetic indigo.

Commercial Solvents Coap. incorporates with capital of $25,000.

The Traffic Problems *of the* Chemical Industry

By Harry M. Mabey

THE freight rate structure of this country is being revolutionized. Not only are we entering an era of Commission-made freight rates; that era is well advanced. It is not at all unreasonable to predict that from now on there will be no important freight rate adjustment not made by the Interstate Commerce Commission, rather than by the railroads. Under such circumstances, the industry interested must either actively participate, by an intelligent expression of facts, in the making of the rate or rates, or regulations, or be guilty of having slept on its rights. The Commission functions in a quasi-judicial manner, but upon a made record. No longer can a business or individual rely upon a friendly railroad to protect its interests. Nor can the Commission be expected to do this, any more than a Court of Law would concern itself with the undisclosed interest of an absentee. It has been said that the accomplishments of a traffic counselor are of the nature of annuities in their benefits to his principals. True, but the reverse is also true; the effect of neglect or laches is also long continuing. Rate adjustments, made by the Commission, are seldom changed other than by the same means. If therefore, all rates become so fixed, industry will find itself compelled to adjust itself to these rates. In an article of this nature, merely the outlines of one important problem can be drawn. There is no intent here to express any opinion on the proper method of making freight rates or their level.

Declaring that the day is fast approaching when a uniform freight rate classification for the whole Country will apply, the general traffic manager of the Mathieson Alkali Works discusses this and other developments of interest to the industry.

One much discussed subject, at present, is that of Railroad Consolidation and the passage of laws pertaining thereto, but it is doubtful whether this really would be a traffic problem of the first importance from an industrial standpoint. The Interstate Commerce Commission is engaged in making a new freight rate structure for the entire country; an important part has just been made effective. A basic rule upon which this rate structure has been made provides that the mileage upon which each freight rate is based shall be the aggregate of the mileage from the point of origin to destination via the shortest route which does not involve transfer of lading. This rule disregards the ownership of the individual railroads involved. What difference in effect would there be, therefore, upon the freight rate, if the now separate railroads were consolidated? None; this rule, in effect, makes them a single system now, for rate making purposes.

So important is a proper appraisement of these changes, that this overshadows the multitude of minor questions which are the routine of traffic work.

Our interest in the question of freight rates or charges may be subdivided under two headings:

(1) Freight charges paid by an industry upon the raw materials which it receives and consumes. These charges are a part of the cost of production and, therefore, the interest is in the measure of the rate paid by the industry itself, and likewise, paid by any competitor upon like raw materials. The chemical industry alone consumes annually in excess of ten million tons of coal, five million tons of salt, five million tons of limestone, beside an important tonnage of other primary raw materials such as pyrites,

sulfur, etc., besides raw materials which in themselves are products of the chemical industry. As freight rates are not made upon any material based upon the use to which the material is put, the measure of the freight rate on these raw materials is not a responsibility of the chemical industry alone. Assurance, however, that the burden of transportation charges against these low grade raw materials is not disproportionate, is well worthy of serious consideration by the chemical industry, one of the greatest users of these commodities. This problem, however, is outside the scope of this article.

(2) The freight rates applicable upon finished products of the chemical industry. As to the rates upon such products, the ordinary interest of industry is in having these commondities fairly rated in comparison with analogous articles and equitably rated from a competitive standpoint with other articles. Generally speaking from a freight rate standpoint, class rates apply on the finished products of an industry; commodity rates on the raw materials consumed thereby, even when these raw materials are products of the industry itself. As a new class rate structure is primarily being discussed here, necessarily the conditions discussed in this article pertain more especially to the distribution of the products of the chemical industry.

The Interstate Commerce Commission, in July, 1925, handed down its decision in the Southern Class Rate Investigation; in April, 1927, its decision in the Consolidated Southwestern Cases. It has before it for decision the proceeding known as the Eastern Class Rate Investigation and a proceeding involving Western Trunk Line Class Rates. The scope of these proceedings is great; the decisions therein will cause the establishment of new class rates to, from and between practically every freight station in the United States east of the Rocky Mountains.

A Specific Case

The first case to be decided was the Southern Class Rate Investigation and the new class rates resulting therefrom became effective on January 15th, 1928 and provided an entirely new set of class rates within the territory east of the Mississippi River and south of (roughly) the Ohio and Potomac Rivers and between that territory and the entire territory north thereof and east of the Mississippi River. These new rates apply both All Rail and Rail and Water or Rail, Water and Rail. The new rates are predicated almost entirely on the distance principle and, while not prescribed as minimum rates, yet are fixed as to relationship, origin point with origin point and destination with destination.

This structure means that no longer will rates to or from the South be made by taking a local rate from the Ohio River or Virginia cities and a local rate to or from a point of origin north or south thereof and adding the two together to obtain the through rates. In other words, a through rate is now in effect in a single factor between practically every point east of the Mississippi River and every point in that part of the country. This means that, if a shipment is handled in transit at an Ohio River or a Virginia city, it will be at the expense of an additional freight charge. Further, rate competition between rail lines and the rail and water lines will not exist. The relationship of their rates is fixed.

Radical also is the decision upon which these rates are based in the rule it establishes under which mileage is figured. This rule provides that the rate between any two points shall be based upon the mileage of the shortest route over which carload traffic can be moved without transfer of lading. The application of this rule means that the individual ownership of railroads is ignored; that no longer is a railroad entitled to rates based upon its long haul but, in fact, that all railroads are to be treated as if, for rate making purposes, the railroads of the country comprised a national system.

New Rate Structure

We have, therefore, in actual being, a new freight rate structure made in an entirely different manner from that which has heretofore existed. The old structure was made by the give and take of competition between the respective railroads in the territory involved, restrained somewhat by public regulation but, essentially, controlled by desire for tonnage and the willingness of a railroad to make low rates where it had to, rather than lose the business entirely. The new rate structure as laid down by the Commission does not recognize competition nor volume of movement as factors. The Commission does not fix minimum rates and, therefore, permits the carriers, or rather does not prohibit the carriers from lowering the level of the prescribed rates, but it does fix maximum rates and it does fix the relationship of origin point to origin point and destination to destination. Essentially, therfore, the new rates are controlled only by distance relationships.

The Southern Class Rate Investigation decision did not cover any commodity rates but clearly indicated a desire that the establishment of commodity rates be limited and that the use of class rates be encouraged.

Following the Southern Class Rate decision, the Interstate Commerce Commission handed down its decision in the Consolidated Southwestern Cases, a document of nearly 300 pages, as a result of which a new system of rates will be established effective not later than April 3rd, 1928 within Southwestern Lines Territory and to and from every point therein and every point east of the Mississippi River. Southwestern Lines Territory embraces (fourthly) the States of Texas, Western Louisiana, Oklahoma, Arkansas, and parts of Missouri and Kansas. This decision brings about results similar to the desision in the Southern Class Rate Investigation previously described; provides both class and commodity rates

based on a distance relationship principle both All Rail and Rail and Water or Rail-Water-Rail. Of striking importance in this decision is the fact that the Commission have fixed the maximum rates and relationship of a great number of articles heretofore transported on commodity rates and, possibly more important to industry is that the Commission have failed to mention in their decision many important commodities, leaving the question of their status very indefinite. Here is a real traffic problem and any industry which is not now actively considering its position in this respect may possibly find itself in a very serious difficulties after these new rates become effective.

Since January 15th, 1928 as the result of the decision in the Southern Class Rate Investigation, a new scale of class rates is effective in that part of the United States south of the Ohio—Potomac Rivers and east of the Mississippi River, and between freight stations in that territory and points in the territory north of the Ohio—Potomac River line and east of the Mississippi River, this being the territory embraced in the Southern Class Rate Investigation. The decision in the Consolidated Southwestern Cases embraces rates within the States of Oklahoma, Arkansas, Texas and Western Louisiana and between such points and all points east of the Mssisssippi River. The pending proceeding known as the Eastern Class Rate Investigation embraces all class rates within the territory east of the Mississippi River and north of the Ohio—Potomac Rivers. The Western Trunk Line Rate Case, now pending, involves all rates between points in Colorado, Iowa, Kansas, the upper peninsula of Michigan, Minnesota, Missouri, Nebraska, South Dakota, Utah, Wisconsin and Wyoming, (which is known as the Western Trunk Line Territory). This makes it evident, therefore, that all the "Class Rates" of the country east of the Rocky Mountains are involved in these four proceedings, either decided or pending.

The scope of these two decisions and the radical changes in the freight rate structure, made thereby, are apparent. The principles followed therein indicate clearly the effects that industry may feel if these principles are also followed when the decisions of the Commission in the Eastern Class Rate Investigation and the Western Trunk Line Rate Case, now pending, are made public.

Freight Rates as Basis of Industry

Industries have been established and have operated for years on the existing basis of freight rates. It is easy to say that these rates that are being discussed are principally class rates, and that the great bulk tonnage in which an industry shipper is vitally concerned moves under commodity rates; but we have seen that commodity rates are definitely related to class rates in the Southwestern decision. The effect of this precedent upon other commodity rates of the country, if followed in other cases and progressed to its ultimate conclusion, is one of the most serious problems affecting industry to-day.

Manifestly, the signal accomplishment of these two decisions, has been the establishment of a through class rate, interstate, between every two shipping points (roughly) East of the Mississippi River and every other shipping point, and to eliminate the use of arbitrary rate breaking points upon which combination rates have heretofore been based.

Having thus established a class rate mileage scale progressing as to distance, in a definite and consistent manner, and, having established a fixed rule for determining the mileage between any two given points, there remained but the necessity for recognizing that conditions in different parts of the Country warranted a difference in the level of rates, due, for instance, to more (or less) expensive operating conditions, varying densities of traffic, or, in brief, to a variance in the earning power of a railroad or a group of railroads. Such conditions have been cared for by the Commission, by prescribing a different level in the scale handed down in the Southern Class Rate Investigation and that handed down in the Consolidated Southwestern Cases decision. As a result of this the class rate from a given point in one of the Central States, for example, for a uniform haul, in length, will differ according to the location of the destination, one rate applying to a destination in one of the Southern States, another rate applying to a destination in the Southwest, and still another rate applying for the same length of haul in the territory in which point of origin is located.

The Freight "Classification"

In practice the term "Class Rates" refers to a scale of rates comprising, at the present time, from six to ten classes, the first class being the highest and the tenth (or Class E, where the classes below 5th class are lettered) being the lowest. In some cases the lower classes show a definite percentage relationship to the highest class, in other cases there is no definite relationship at the present time, but it is sufficient to say that the trend is toward the establishment of a definite relationship of each class with the other. It is manifestly impossible to publish a specific rate on every article offered for freight transportation; this is accomplished by means of a Classification governing the Scales of Class Rates. Every article in Commerce is therefore listed, in a Freight Classification which contains all the general rules under which transportation may be had, outlines specifically the method of packing, and assigns each article to a designated class, thereby making that article automatically subject to the rates applying to that class in any class rate tariff which is governed by that Classification. For Interstate traffic within the United States there is but one freight Classification known as the Consolidated Classification but this in itself is divided into three Classifications known as the Official, the Southern and the Western Classifications. The ratings on a

specific article may differ, and in many cases do differ, according to the territory in which the respective Classifications are effective. This is specifically governed by the class rate tariff. Such uniformity as does appear is the result of years of efforts on the part of the Carriers to reconcile the differences in conditions prevalent in the respective territories, which have been considered to warrant non-uniform ratings, in the various Classifications, in the past, and which, in many cases, still prevail.

A rough description of the boundaries of three Classification territories is necessary in order that the effect of the new class rate scales may be clearly shown. The Official Classification Territory, which is the territory within which that Classification governs, comprises roughly all the States East of the Mississippi River (excepting parts of Wisconsin and Northern Michigan)and North of the Ohio Potomac Rivers and extends East to the Atlantic Ocean. The Southern Classification Territory comprises the States (roughly) South of the Ohio Potomac Rivers and East of the Mississippi River. The Western Classification Territory includes practically all the territory West of the Mississippi River, parts of Wisconsin, and Northern Michigan, and in this territory as a rule the Western Classification governs all class rates. From this it is evident that so long as class rates from a point in one Classification territory to a point in another Classification territory, are made by using a local to a point on the border of the territory plus a local beyond, need for uniformity in Classification is not absolutely essential, but, where the class rates are through rates from a point in one Classification territory to a point in another Classification territory, there is need for a uniform Classification throughout all the territory.

This very Classification condition has been prominently before every Industry desiring, of late, to arrange for any change in an existing Classification rating. This is due to the conflict of levels of rates, varying in different Classification territories, with what is known as the Fourth Section Rule. The Fourth Section Rule is the legal requirement under the Interstate Commerce Act, that no rate between two given points can lawfully exceed the rate to a more distant point, the shorter distance being entirely included within the longer one. It is readily apparent that the term "rate" involves Classifications because the two are inseparable, because, in the case of any class rate, the Classification rating assigned to the article, is directly controlling as to the rate applicable thereon. So long as rates break on the borders of two different Classification territories, this rule does not ordinarily become involved, but when through rates are established and they are made subject to either one of two differing Classifications, a violation of this Fourth Section Rule usually occurs, and practically the only manner in which such violations may be definitely avoided is the accomplishment of uniformity in Classifications.

Many interested shippers have been seriously incommoded because of apparent delay on the part of the Classification Committees to dispose, heretofore, of many applications on their dockets for changes in ratings, or for new ratings. Part of this difficulty has now been overcome, and relief may be promptly expected, by the publication by the Classification Committees of many ratings, which have been delayed until now, but which are now permitted under a special order of the Interstate Commerce Commission giving the Classification Committees and the Carriers a limited relief from the application of the Fourth Section Rule.

Need For Uniform "Classification"

This relief, however, does not permanently cure the basic trouble. It is difficult to see how the definite work of establishing a Uniform Classification for the whole Country can be longer delayed.

The chemical industry is vitally interested in the Classification as it is probable that the great majority of its products are moved on class rates and class rates are determined by the applicable freight classification. Naturally, if there are two or three differing rates on a given article in different parts of the Country caused by different ratings in the particular Classification governing, one of these ratings will be determined upon as proper for use in a Uniform Classification. It should be remembered that there are two ways, at least, in which a rate may be increased, one, by an increase in the rate itself, the other by the imposition of a higher rate resulting from the transferance of an article to a higher class in the governing Classification.

So far we have been considering the ratings of the Classification as affecting particularly the finished products of the chemical industry. In another very important respect they affect the freight bill paid by the chemical industry because the Classification rating governs the freight charges paid by the industry for the transportation of empty containers. The item of freight charges on returnable containers is a peculiar problem of the chemical business. This industry probably has the greatest investment in Containers, of any one group. They are invariably returned by the consumer, empty, at the expense of the manufacturer. The ratings on empty containers in the three different Classification territories is very dissimilar; so much so that if the highest rating now prevailing in any Classification were applied uniformly, the result would probably be to double the freight bill of the chemical industry on this item.

It seems apparent therefore that, in addition to the specific problems which are now before it in respect of new class rates adjustments; the chemical industry should prepare itself to cope with another important traffic problem. The coming movement toward establishing uniformity in Classifications throughout the United States. As specific ratings on specific

(*Continued on page 240*)

BAGS

As Chemical Containers

By Homer V. Howes

Director Commercial Research, Bemis Bros. Bag Co.

THE number of different chemicals that are being packed in bags is constantly increasing. This is due to the mounting cost of wood and other types of containers and the growing recognition of the new developments in bag manufacturing which have taken place within the past few years. These innovations make bags practical for use for many chemicals that formerly were thought to require the more costly types of containers.

Bags carry more of the worlds goods than any other single type of container. In spite of this very extensive general use of bags, each commodity must have a bag especially designed for it. Bags are, therefore, "custom made" for the product which is to be packed. The reason for this is that every substance has certain individual characteristics that alter to a greater or lesser extent the type of bag to be used. For example, calcium chloride must be kept dry and free from moisture. An ordinary burlap sack will not do.

There are accordingly no stock sizes in bags, although there are, of course, regular sizes used for the specific commodities that are most commonly packed in bags.

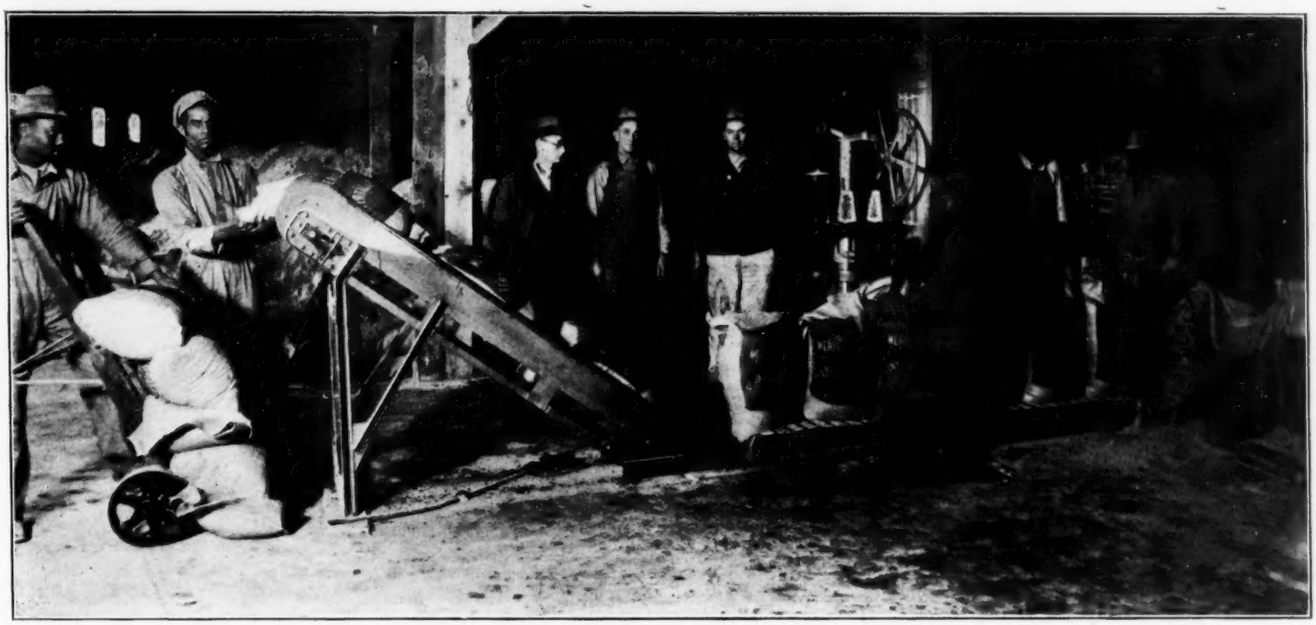
The practical advantages of bags are many.

The cost of bags is small: Container costs are frequently reduced 40% by the use of bags in place of more expensive packages.

Bags are easy to handle: Convenient units are made so that one man can easily lift and store them away without help. Modern machinery has been developed for filling, weighing, closing, conveying, and storing bags so that labor gangs are reduced in number and handling processes speeded up.

Tare weight on bags is less: Tare weight is no small item when a large volume of shipping is done. Bags are so much lighter than other types of containers which they displace that a saving in tare weight of as much as 80% is usually made. This reduces the freight charges on every shipment made in bags.

Bags save storage space: Filled or empty bags require a small amount of storage space. Empty



Filling and machine stitching bags of "Meridian Brand" fertilizers, showing the easily operating labor-saving machinery which has been an important factor in the rapidly expanding use of bags in the shipping rooms of many branches of the chemical industry.

Loading bagged chemicals at the shipside for export, where the flexibility and close packing characteristics of this container in a vessels hold is a marked advantage, while the extreme low tare effects an additional saving.

bags are packed in compressed bales of 500 each more or less according to the size and type. One bale of 500 bags occupies the same amount of space as a single empty barrel. Filled bags are flexible and store so compactly that they occupy 40% less storage space than an equivalent amount of a product in barrels or drums.

Brands and trade marks may be printed on bags: Modern bag printing has reached a high state of excellence so that brands printed on bags are a real advertising and sales asset. Bright attractive colors of many hues are used. This is part of the service offered by bag manufacturers. They also have commercial artists on their staffs who will design brands if desired.

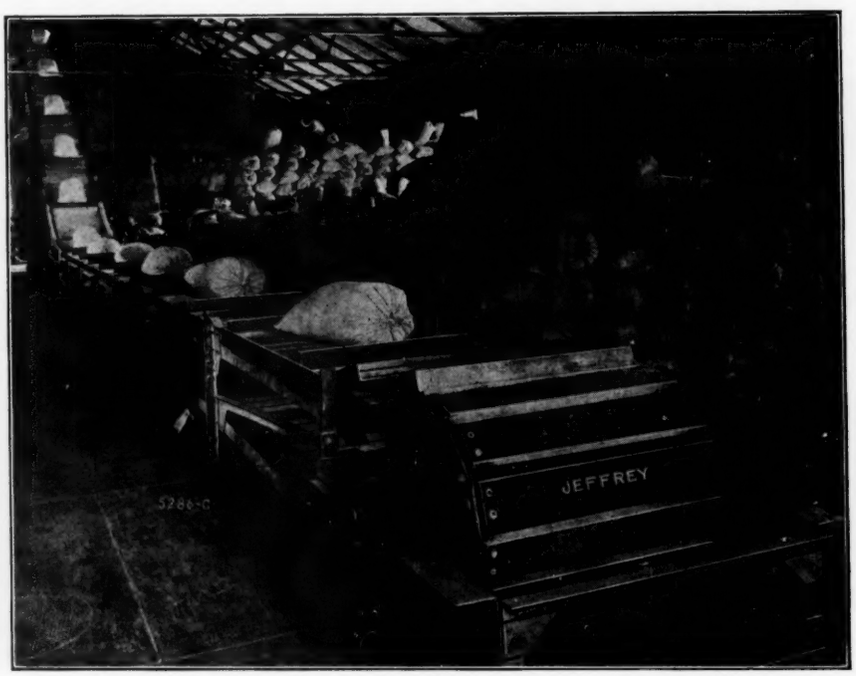
Too much emphasis cannot be placed on the importance of selecting the right type of bag to properly carry the commodity to be packed. Failure to do this may result in breakage in handling or in transit and subsequent claims and endless correspondence and disputes.

To select the proper bag for a given chemical all the characteristics of that substance must be taken into consideration. If it is hydroscopic then a moistureproof bag must be furnished. If it is a very fine powder then a sift-proof bag is necessary. If its specific gravity is high a strong bag that is not too large to handle conveniently must be made.

The mistake is sometimes made of trying to pack the same amount of material in a bag that has formerly been packed in a barrel or other bulky container. Usually it is not wise to do this because the flexibility of the bag makes an awkward package to handle if too great weights are packed in it. The best sizes in general for the average commodity is 100 to 200 pounds. Stearic acid, for example, is packed in 150 pound units and sulfur in 110 pound units. Each product must have a bag that is "made to order" for it. A too small unit is not economical, a too large unit is awkward and cumbersome to handle.

Whenever bags are substituted for other types of containers substantial savings are effected. However, ever in a while an attempt is made to further reduce costs by substituting lighter weight goods than those recommended. This is false economy as damage claims are certain to result. The larger bag manufacturers maintain a staff of technical experts who devote their time to solving packaging problems. Reliance may be placed on their judgment as to the quality and strength of goods required for any specific chemical.

There are four principal types of bags most com-



No other container, so this authority claims, lends itself so perfectly to use with such a wide variety of automatic conveying machinery of all types as does the bag, which is here shown sorting soda ash in warehouse.

monly used for packing chemicals:

Cotton Bags
Burlap Bags
Paper Bags
Double Bags

Chemicals are frequently packed in more than one type of bag as, for example, for borax cotton and burlap bags are both used.

Cotton bags are generally used where appearance and cleanliness are essential. The white cloth gives a very fine appearance to the bag and is clean and sanitary.

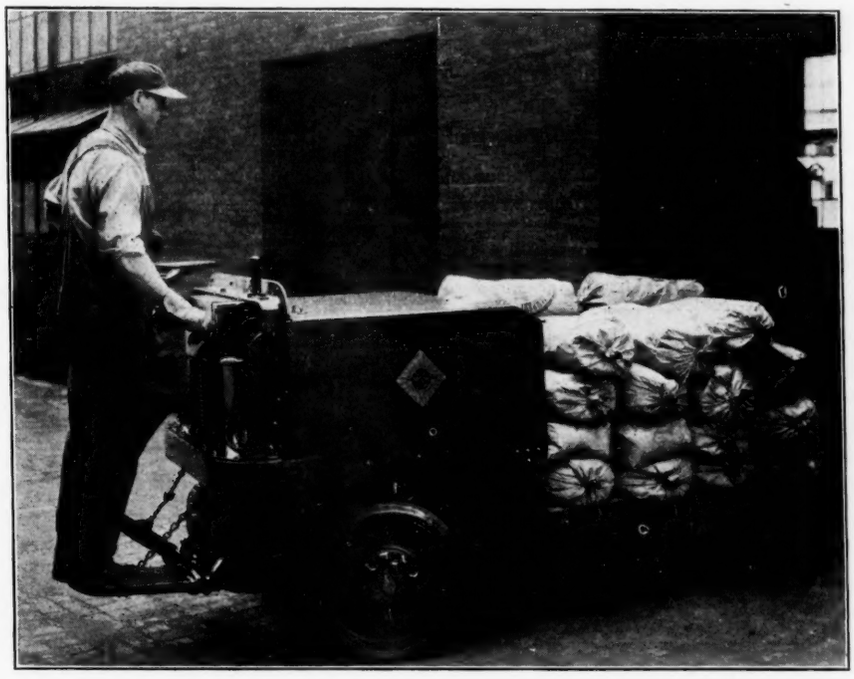
Burlap bags are used where strength is paramount and appearance is not so essential. Burlap cloth is made in many weights and widths. It is, therefore, a kind of material that is adapted to many purposes. It is moreover, strong and tough and will withstand rough handling encountered in transportation. Burlap bags are usually used when comparatively large amounts of a product are to be packed in one unit. They may be made to hold 200 to 225 pounds although smaller sizes around 150 pounds are more convenient to handle.

By the use of this stacking machine a single man is able to handle forty or fifty of these 25 lb. cotton bags at once, stacking quickly, neatly, and with a compactness which gives 40% more material per cubic foot than barrels.

Paper bags are used for small units. One pound up to 50 pounds are the most common sizes. The paper stock may be either kraft or rope paper. The latter is very strong and tough. Small size paper bags are in common use for insecticides, lithopone, and zinc oxide.

There are two types of double bags: (1) loose liners. (2) attached liners.

Loose liner bags are made of ordinary burlap or cotton cloth with burlap, cotton or paper bag liners inserted in them. This type of bag is used to give extra strength, to prevent sifting or exclude moisture. Granulated sugar is packed, for example, in heavy burlap bags with a light cotton liner to prevent sifting.



Paper, cotton, burlap, linen—single and double—bags are made-to-order, as it were, to hold any dry material, while the recent improvements in water-proofed and sift-proof bags has tremendously widened the scope of bag use.

Attached liner bags are made of a burlap or cotton outer layer to which is attached, by a special adhesive, an inner liner of cotton or paper of one or more plies. These bags make a very desirable container for chemicals as they are waterproof, dustproof, and siftproof. Calcium chloride and quicklime are packed in these bags. They are also used for dry paints and colors, aluminum stearate, glauber's salt, alum, and many other chemicals.

Many styles of equipment are on the market for handling bags. These make the process of packaging, when bags are used, a comparatively simple one.

The manner in which bags are filled depends largely on the amount of a commodity handled. The simplest form of filling is to have a support for the bag or

what is termed a bag holder. The product is then shoveled or scooped up into the bag, or the material may come down through a chute and thus directly into the bag. When large quantities of a commodity are being handled mechanical packing machines are used. Mechanical packing machines are of two types, pre-weighers and gross-weighers. The pre-weighing type automatically weighs into a hopper the desired amount and discharges it into the sack in one dump. The gross weighing type weighs the sack and its contents.

Some commodities flow freely and require only the force of gravity to force the flow into the bags. Other commodities are not free flowing, that is, they will not flow in a uniform stream except when some sort of mechanical feeder or agitator is used to assist the flow. Such mechanical feeders include the auger type, belt and screw conveyors and various types of mechanical agitators. For materials which do not of their own weight pack tightly, such as soap flakes, shaking devices are provided for jogging down the material into the sacks.

There are three methods of closing bags after they have been filled. (1) Tying the top with twine or wire tie. The top of the bag is simply drawn together and a piece of twine tied around it. With the wire tie a special tool working on the principle of a ratchet screw driver, twists the wire about the neck of the bag, thus effectively securing the contents against sifting. (2) Hand sewing. The bag is sewn up using a large needle and heavy twine forming ears at the corners. This is the ordinary type of closure seen. A special twine is used that is soft, pliable and does not kink, enabling the packers to work very fast. (3) Machine closing. This is the fastest method of closing bags and is used where the production is large. The bag is supported on a platform or conveyor and the top sewn straight across.

Bags are the easiest type of container to handle from an efficiency standpoint. One man can handle them alone, lifting, storing, and piling. They are flexible so that drops and jolts do not injure them. Several bags can be handled at one time on an ordinary hand truck. Care should be taken to use bag trucks as barrel trucks allow the bags to drag on the wheels. When bags drag in this manner the abrasive action of the truck wheels soon wears through the cloth or weakens it so that breakage is likely to occur. Hooks should never be used in handling bags.

Special chutes or other gravity type chutes are used in lowering bags. Mechanical lowerators, elevators, belt conveyors, are all used in conveying from packing room to warehouse and freight cars. Various types of portable elevators and conveyors are in general use in tiering bags when stored in warehouses.

When bags are received filled with commodities the manner in which they are opened is of some importance. Bags have considerable salvage value after they have been used once, if they are still in good

(*Continued on page 240*)

Who's Who In Chemical Industry

Adamson, George P., director of research, General Chemical Co. Born, Phila.; educat., Lafayette Coll., B. S., M. S. The Baker Adamson Chemical Co., vice-pres. and genl. mgr.; Genl., Chem. Co., dir. res. Clubs: Chemis's' and other social clubs. Hobbies: flowers, golf and fishing. Address: General Chemical Co., 40 Rector St., New York City.

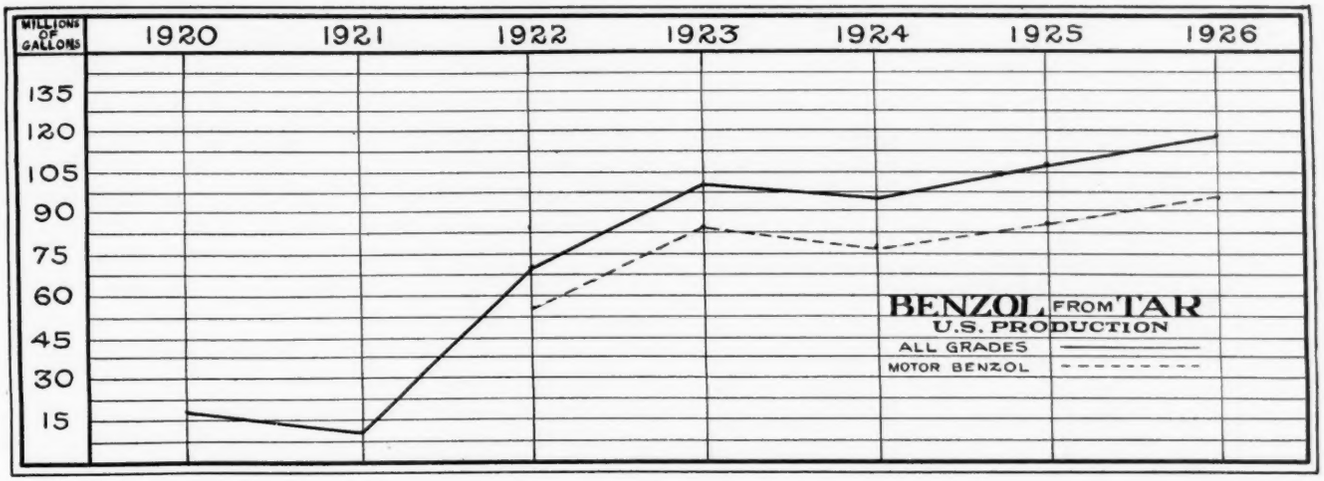
Andrews, Chester Earl, chief chemist in charge of production, The Selden Co. Born: Homer, N. Y., 5 Nov. 1891; mar., Hazel Cunningham, Pittsburgh, 27 Jan. 1923; children, 2 daus.; educat., Syracuse Univ., B. S., M. S., 1913-14. The Aluminum Co. of America, chem., 1914; Univ. Maine, instr. chem., 1914-15; Eastman Kodak Co., res. chem., 1915-17; Dept. Agri., Wash., D. C., color lab. chem., 1917; The Selden Co., 1917 to date. In charge of construction of chemical plant in Great Britain. Memb. Amer. Chem. Soc., Alpha Chi Rho, Alpha Chi Sigma, Sigma Xi, Phi Beta Kappa, Mason, Grotto and Kiwanis. Address: The Selden Co., McCartney St., W. E. Pittsburgh.

Bacchus, Thomas W., vice-president, Hercules Powder Co. Born: Sandbach, Eng., 1862; mar., Mary E. Jones, Lima, Ohio, June 1896; children, 1 son, 2 daus.; educat., Eng. publ. schls. Hercules Powder Co., salesman, 1893-94; Hercules Torpedo Co., mgr., 1895-99; Great Northern Mfg. & Supply Co., vice-pres., 1899-1902; E. I. du Pont Co., supt., Repanno Works, 1902-12; High Explosive Dept., genl. supt., 1912 until dissolution, 1913. Inventor of gelatin dynamite machine now used by du Pont, Hercules and Atlas Powder Co's. Clubs: Wilmington, Wilmington Country, Bnkrs. of Amer. (N. Y.), English Spkg. Union. Hobbies: Guernsey cattle breeding, farming, golf. Address: Hercules Powder Co., Delaware Trust Bldg., Wilmington, Del.

Bennett, Earl Willard, auditor, assistant secretary, assistant treasurer, director, The Dow Chemical Co. Born: White Cloud, Mich., 18 Jan. 1880; mar., Eva Victoria Barclay, Midland, Mich., 9 Aug. 1905; children, 4 sons, 4 daus.; educat., common schl., Midland; Union hig schl., Grand Rapids, Mich.; grad. Bryant Stratton Coll., Chicago, 1897. Marshall Fields Wholesale, Chicago, 1897-1900; Dow Chemical Co., 1900 to date, auditor 1902, asst. secy. & asst. treas. 1905, dir. 1927. Trustee, Kalamazoo College, 1920 to date. Chemical State Savings Bk., vice-pres., 1917 to date. Treasurer Community Relief Fund, 1917-26. Clubs: Rotary (pres. 1919), Midland Country, Mason, Shriner. Hobby: fishing. Address: The Dow Chemical Co., Midland, Mich.

Carpenter, James Henry, sales manager, The Tar Acid Refining Corporation. Born: Concord, Lewis Co., Ky., 4 May 1891; educat., Cornell Univ., A. B., 1912, B. C., 1914. E. I. du Pont de Nemours & Co., mfg. supervisor, 1914-16; The Barrett Co., tech. sales, 1916-17, 1919-22; Electro Bleaching Gas Co., 1924-25; Tar Acid Refining Corp., 1925 to date. 2nd Lt. U. S. Army, 1917-19, Asst. Div. Gas Officer, 90th & 91st Div., A. E. F. Memb., Amer. Chem. Soc., Kappa Alpha Frat., N. Y. Southern Soc., N. Y. "Kentuckians," and Montclair Athletics Club. Hobby: Outdoor sports. Address: The Tar Acid Refining Corp., 62 Maiden Lane, New York City.

DeGreeff, Robert Henry, president, R. W. Greeff & Co., Inc. Born: Frankfurt, Germany, 3 Feb. 1884; Mar. Elsie de Greeff (Dec. 1923), 2nd, Lillian E. Palmer, N. Y., 1 Apr. 1926; children, 1 dau.; educat., Germany studied chem. with Fresenius, Wiesbaden. Joined R. W. Greeff & Co., Ltd., London, Eng., 1906; R. W. Greeff & Co., Inc., 1914. Clubs: Lotos, N. Y. Athletic, Drug & Chem., Metal & Rubber, Chemists', Cherry Valley Golf. Hobby: golf. Address: R. W. DeGreeff & Co., Inc., 64 Water St., New York City.



BENZOL

Industrial Uses Market History Past and Future

IF supply and demand control price—and it is an economic truism that such a control is more direct and much more prompt in its action upon standardized, basic raw materials for industrial use, such as chemicals, than upon fabricated goods sold to the general public — then, the benzol market is dominated by two factors quite beyond the realm of chemical enterprise. For the supply of benzol comes, in the main, from the operations of the coking ovens, and the chief consumption of benzol is by the blenders of motor fuels. Thus, the steel industry and the automobilist together make the benzol market.

This is indeed a far cry from the time when the demands of the aniline dye makers first made benzol a chemical product of major commercial product; when solvent naphtha accounted for a third of the benzol output; when a market outlet for benzol was seriously sought in the enrichment of illuminating gas; when, in other words, benzol was a chemical used in chemical operations.

Something over a century ago (in 1825 to be exact) a raw-boned, angular young man, who under the tutorship of Sir Humphrey Davy had turned from bookbinding to chemistry, was carrying on pioneer work in the liquidification of gases. He had just been appointed his master's successor at the Royal Institute, in London and already he had begun experiments that would make him the father of electro-chemistry, the greatest of his great teacher's chemical discoveries; so that at the time he probably attached little importance to a white, pungent liquid containing six atoms of hydrogen combined with six atoms of carbon which he isolated out of the illuminating gas.

Though it attracted so little attention, the discovery of benzol has had momentous effects both upon the science and the industry of chemistry. Eight years later the German chemist Mitscherlich found the same hydrocarbon by heating benzoic acid, prepared from natural benzoin, the dragon's blood of the old apothocary shops. In 1845 Hoffmann rediscovered it in coal-tar. A chance word about the possibility of making synthetic quinine, which Hoffmann left drop in the hearing of his apprentice, William Perkin, set the young Englishman to working in his rough laboratory at home nights, work which led to the discovery of the first coal-tar dye.

Within a few years the number of chemical compounds built up from the starting point of benzol were a legion and their industrial manufacture grew apace.

The first commercial source of benzol was from coal-tar, and the first commercial process for its preparation by fractional distillation was perfected by an Englishman, C. B. Mansfield. The earliest uses were as an illuminant in the Read-Holliday lamp and as a rubber solvent, especially in the making of 'macintoshes' and other rubberized fabrics. But as the dye industry grew, demand outran supply, and price of benzol climbed up from three shillings a gallon till in 1881 it reached a peak of fifteen shillings.

Such a price naturally stimulated a search for other sources, and in that year, another Englishman, Wilfred Irwin, working in the laboratories of Hardman & Co., extracted three gallons of benzol from a thousand cubic feet of coal gas. The company made arrangements to buy gas at three shillings a thousand from the Manchester Gas Committee; but even with this handsome differential the pilot plant erected for experimental operation was not a commercial success until Hardman began making their own coal gas out of cheap, slack coal and recovering the ammonia and coal-tar. The yield of benzol was cut to two gallons

from a ton of coal; nevertheless the process was practical, and in 1883 contracts were made for forward delivery at a price of ten shillings.

At this time the world's output of benzol is estimated not to have exceeded two million gallons annually. Ten years later the by-product recovery coke oven was perfected, and became the principal source of benzol. The world's output has increased to in excess of two hundred and fifty million gallons, almost half of which is produced in the United States.

Our early demands, however, were supplied by imports from Great Britain. With these supplies were brought over the standard English grades. Commercial supplies of benzol were in reality a mixture of benzol, toluol, and xylol; and the different grades were first developed to meet the demand for more definite, purer materials on the part of the young dye industry. The 30% grade (meaning that 30% by volume of the mixture distills at below 100°C.) was originally used to make "aniline for red" and the 90%, for aniline "for blue," while the so-called pure grade was developed for the manufacture of aniline black. The composition of these different grades was approximately:

	90% grade	50% grade	30% grade
Benzol	80.9	45.4	13.5
Toluol	14.9	40.3	73.4
Xylol	2.2	12.4	11.7
Impurities	2.0	1.9	1.4

At the present time, owing to the higher prices of toluol and xylol, these grades are seldom found of this composition, since the recovery of each product, distinct and separate, is the more profitable proceedings.

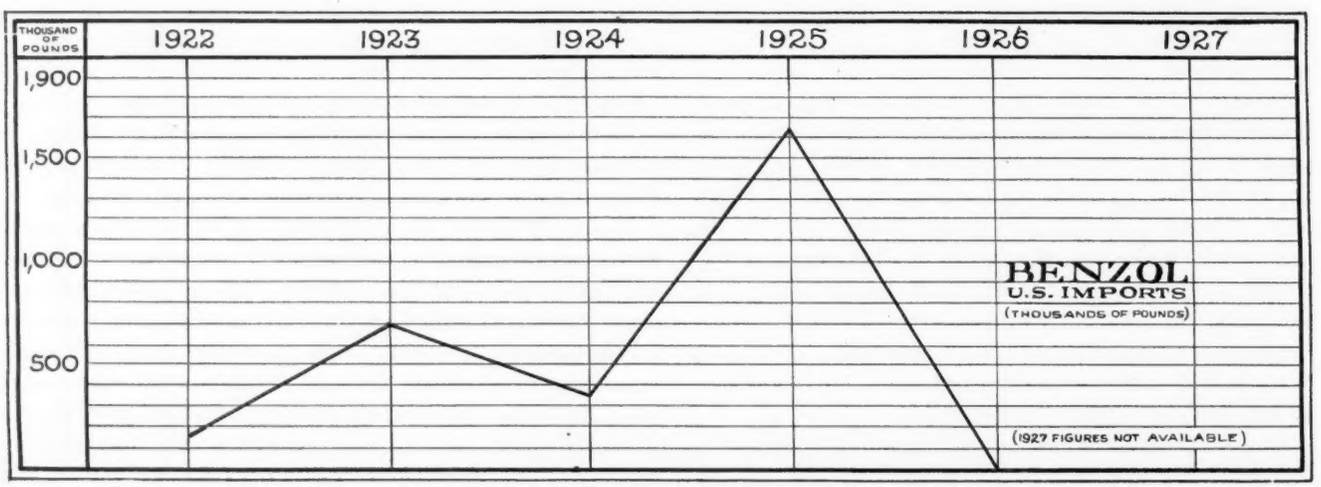
In the late 80's the first commercial production of benzol from coal gas was begun in a very modest way in the United States. The first by-product coke oven erected in America was built by the Semet-Solvay Co. at Syracuse in 1892. It was a battery of twelve ovens installed primarily to produce ammonia since at that time there was no thought of recovering the benzol. In fact it was not till 1900 that the same company at the same plant installed the first light oil recovery process in operation in this country.

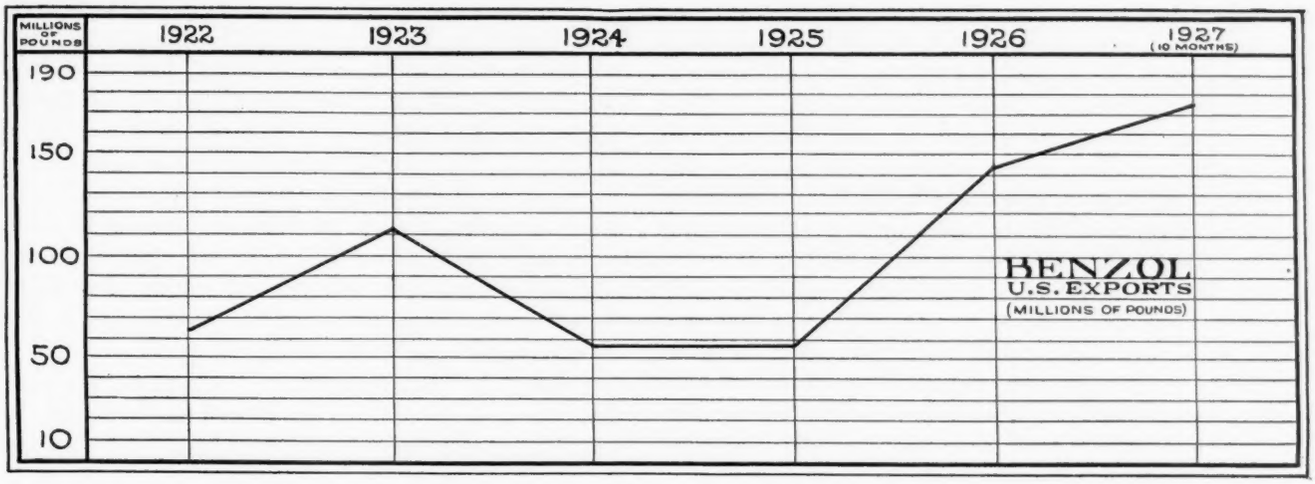
It was just about the time of this initial installation that benzol began to find a use, mixed with alcohol, as a paint and varnish remover. Prior to this its use in the United States was most limited. We had no dye industry and there was consequently no demand for the manufacture of intermediates. The heavy consumption of the rubber industry has come with the manufacture of the tire, as has also the notable consumption in the manufacture of artificial leather which the motor car makers use in constantly increasing quantities for upholstery. One of most important of the earlier uses was in the rubber cement employed for sanitary sealing of jar and cans in the food industry.

Throughout the first decade of the century supply and demand played a game of see-saw. For six months the sum of all the miscellaneous, but growing consuming demands would surpass the benzol output. A little extra recovery at gas works, eked out by some quick, shrewd importations, would swing the balance the other way till surplus stocks would begin to accumulate. Naturally prices swung back and forth in a way that was at once disconcerting to the consumers and disturbing to the producers. Gradually, however, the increasing number of by-product coke ovens bid fair to assure a surplus that was dangerously in excess of consumption, and it was at this time, in 1911, that the first experiments were made with benzol as a motor fuel. It was also during this period that the Barrett Company by centralizing the output in the hands of a strong, efficient selling organization did much to stabilize the market and to preserve the domestic industry from foreign competition which was always watchfully waiting for an opportunity to step in and fill any excess demand.

In 1914 the war in Europe completely upset existing conditions.

First, it created an insistent, not-to-be-satisfied demand for toluol, for explosives manufacture which rushed the price up from 35c a gallon to over $9. Second, the demand for pure benzol for the manu-





facture of aniline, synthetic phenol, and various intermediates of the new born American dye industry, was created almost overnight and the price reached a peak of $1.10. Obviously, it was most profitable for every producer to split up the old 90% grade into its principal constituents, and especially to recover every last drop of toluol. Although the chief source of benzol at the outbreak of the war was from coke oven gas, nevertheless only the one company, through operating a number of different plants, was operating this recovery process. The war demands soon caused every by-product coke plant in the country to install benzol recovery and refining units, so that by 1916 the price began to lower somewhat, and by 1918, all by-product coke ovens in the country, both old and new, were stripping their gasses of the light oils and refining out of them both benzol and toluol.

The War ended, and our benzol producers found themselves loaded with eighty million gallons surplus.

A considerable market, it is true, had been built up by the dye industry's needs for intermediates. Some of the older uses of benzol, however, had been lost due to the introduction of acceptable substitutes during the period of soaring war prices. The readjustment period found the industry therefore, with a normal production of something over a hundred million gallons and a demand for chemical and solvent uses which hardly amounted to ten per cent. of the available supplies.

In desperation the benzol producers turned to the motor fuel consumer. Experiments first made in 1911, supplemented by the wider experience in Europe where benzol had been most successfully used to eke out imported gasoline, were revived, and out of the dire necessity of the producers was created a market for blended gasoline, which having real merit for its anti-knock qualities and its characteristic ease in starting cold motors during winter weather, found ready acceptance. Within a year the price base of the benzol market had shifted for a second time. Prior to the war the 90% grade was the determining factor. The war period saw the almost complete market dominance of the pure grade. Since 1919, so-called motor benzol, which is normally the whole of the light oil distillate up to a temperature of 170° C, has set the benzol price.

This motor fuel market, once developed, expanded quickly. In fact it solved the problem of over-production so completely that it threatened at first to curtail seriously our necessary supply of pure benzol for the chemical industry and of the 90% grade for solvent uses. It is both cheaper and simpler to recover only the crude benzol, without carrying the further recovery processes necessary to separate out the various grades. Accordingly, most of the steel companies and other coking operators, not being primarily in the chemical business and finding a ready market for their crude benzol recovery, were quite naturally only too willing to follow this easy and in the main profitable course. Since the blended fuels, containing from twenty to forty per cent. of motor benzol, then commanded a premium of ten cents a gallon at the roadside gasoline pump, the producers seemed reasonably assured of a benzol price that bore a 10c per gallon premium over tank wagon gasoline prices in the principal cities. There was obviously little incentive to split the motor grade.

Two new factors in the benzol market have caused just a ripple of disturbance in this complacent easy-going situation. The lacquer industry has furnished a constantly growing market for toluol at premium prices. This has led the producers to strip more and more of the motor benzol of its toluol, and as they must at the same time strip it of its other distillates, this tends to make motor benzol and pure benzol identical. The results of recent development are set forth in an estimate made last year by John M. Weiss (Chemical Markets, xx, 19, p699) of the present distribution in gallons:

	Benzol	Toluol	Xylol
Chemical manufacture	4,000,000	1,500,000	
Rubber industry	3,000,000		
Imitation leather	500,000		
Paint and varnish	500,000		1,000,000
Lacquers	1,500,000	3,500,000	1,000,000
Miscellaneous	1,500,000		

The motor benzol market is absorbing more than eighty million gallons, but there is some speculation as to what the effect of synthetic motor fuels and other chemical anti-knocks will have this consumption.

Reports from Germany as to the use of liquified, hydrogenated coal as a motor fuel are as yet somewhat conflicting. There is obviously an effort on the part of the backers of the Bergious process to prove that their material unblended is an ideal fuel, and considerable publicity has been given to the news that several automobile races in Germany have been won by cars using this product unblended. On the other hand, from France and other countries most favorable reports support benzol blends, which in a wide variety of formulas have been used widely and successfully for a number of years.

Quite aside from the rival merits of Benzol and tetra-ethyl lead, as a fuel blend the former has one marked industrial advantage. Our supplies of benzol are strictly limited by the activities of coking ovens which in turn depend principally upon the scale of operations in the steel industry. While there have been steady gains in the number of by-product coke ovens and the percentage of coke produced by this more modern and economic method as against the old beehive ovens, nevertheless, the benzol output is but an insignificant fraction of our gasoline consumption. Upon the basis of a 25 per cent Benzol blended in motor fuels, our supply of ninety to one hundred million gallons of benzol would blend only three hundred million gallons of motor fuels against which must be set our total gasoline consumption in automobiles of over twelve and a half million gallons.

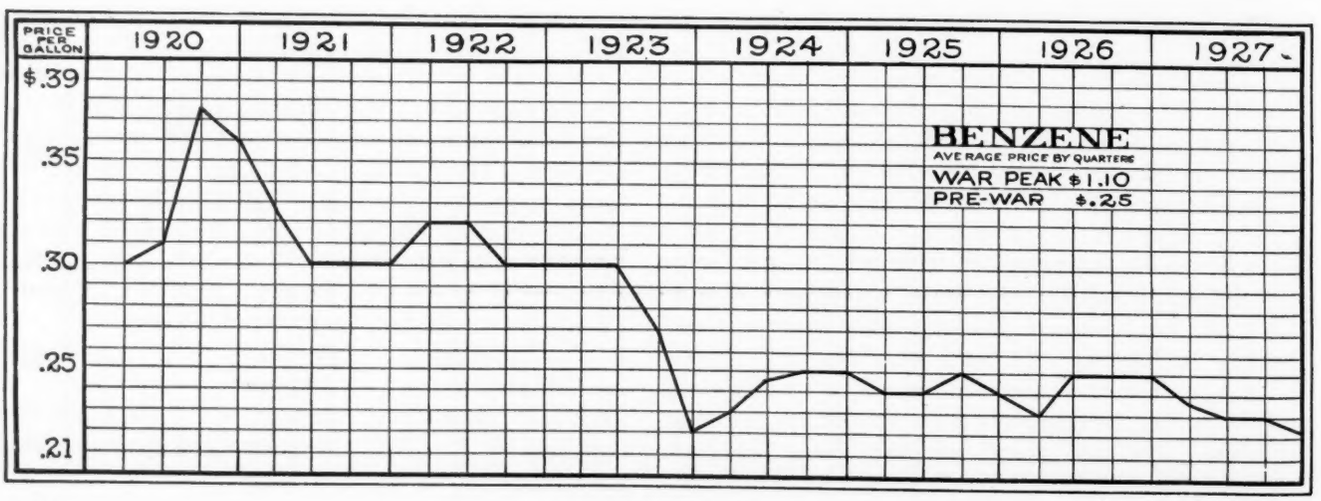
Tetra-ethyl lead, on the other hand, is used as a blend in the extremely small quantity of one part tetra-ethyl lead to 1,300 parts of gasoline, and is furthermore a product whose output can be definitely increased. In other words, while benzol could furnish a blend for one-fortieth of our automobile fuels, tetra-ethyl lead consumption (if warranted by demand) could be increased so that every gallon of gas distributed at the wayside station could be treated with this chemical compound.

The corollary of this situation is the fact that presumably the cost of tetra-ethyl lead would be lower as the production is increased and that with the prospect of synthetic ethyl alcohol, this price factor might seriously effect the benzol producer. The irreducible miniumm of benzol prices is therefore a parity with tank-wagon gasoline quotations. Already the various ethyl gases, so-called, are selling in most sections of the country at a five cent premium over straight run gasoline and benzol blends have been forced more or less, according to the intensity of the competition, to meet this price.

All of these considerations but emphasize the fact that the control of the benzol market situation is outside chemical hands. It is perfectly possible that the development of chemical motor fuels or chemical substances like tetra-ethyl lead as competitive blends will have a determining factor on the future developments; but it is quite as likely that changes in the design or in the construction of internal combustion engins will in the future be of greatest importance to the benzol producer.

Although production based on steel activities and consumption arising in the automobile field has removed benzol almost bodily from chemical market considerations, nevertheless, it must not be forgotten that the entire development of the coal-tar chemical industry in this country depends absolutely upon adequate supplies of benzol, toluol, and xylol. From the point of view of the development of these industries, admittedly essential in the chemical economics of the country and necessary for the national defense, the supply of these materials for intermediates must be considered the primary market for light oil distillates.

Producers and their sales agents would do well in view of the disquieting possibilities of new developments in the motor fuel market, to recognize that there is a prospect, at least, that benzol as a raw material of the chemical industry and as a solvent may again return to the chemical fold.



Why "SAFETY" Pays

By G. Edwin White

Instructor in Chemical Engineering
College of the City of New York

INERTIA! Characteristic of masses—masses of men as well as masses of material—mass organization as well as massed matter. In one word, the epitone of perhaps the most important foe of industrial progress, a foe stubborn, wary, implacable, giving ground slowly before the onslaughts of the far seeing, but relinquishing the field of battle—never!

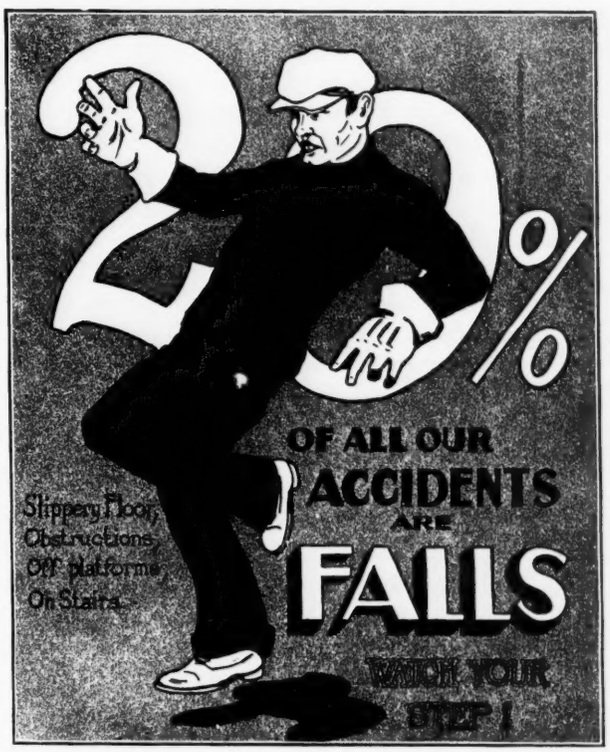
Herein lies one of the big problems facing those who, themselves already convinced of the economic and sociologic desirability of safety activities, try to "sell" the idea to others. Fundamentally, of course, a chemical industry executive can be expected to adopt a course of action only if he foresees in it a profit. To convince him that such profit will actually accrue, the evidence and argument presented must be weighty indeed in order to overcome this naturally human tendency to avoid radical changes in a functioning organization whose performance may already be regarded as "good enough."

It is not possible here to elaborate statistical proofs of the advantages of safety activities, but it may be well to indicate some of the directions in which results may be expected. Thus might be enumerated:

1. Saving in costs of replacement occasioned by accident.
2. Saving in workmen's compensation.
3. Saving in time—an accident in one process unit may cause enforced idleness of machinery throughout the factory, entailing large and cumulative losses.
4. Schedule disruptions. These may cause even greater loss than the mere time involved, as, for example, through cancellation of orders by rush customers.
5. Attraction of higher calibre labor and minor executives, resulting in increased production efficiency.

It should be noted that even where the first two items are covered by insurance, a saving in the form of lower insurance rates is nevertheless effected. It must be remembered that insurance is merely a device whereby civilized communities distribute financial losses occasioned by chance happenings, and that while the burden is thus prevented from falling too heavily upon a single individual or group, the overall cost to the community is not decreased.

For the efficient administration of safety activities, delegated authority is frequently vested in a safety committee, consisting of perhaps two or three important officials working in conjunction with a "safety engineer." The object of naming officials as members of this committee is to insure their active interest



An example of the type of poster which factory owners are urged to display in prominent points throughout their plants.

and continued support of the movement. The safety engineer is also aided in making the administration of safety measures, once established, an integral part of the working routine, thus releasing the engineer himself for new investigations and constructive effort.

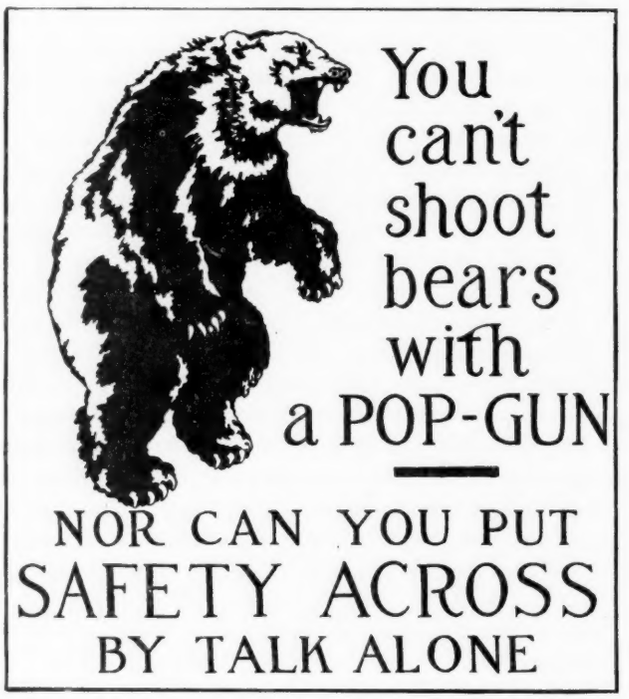
In addition to the emergency duties of the safety committee in investigation of accidents, fixation of causes and recommendation of preventative measures, we must regard as highly important the educational phase of their endeavor which has for its object the stimulation of active co-operative enthusiasm on the part of the rank and file of employees. As examples might be mentioned:

1. Creation of interdepartmental competition. In many plants, bulletin boards erected in conspicuous places in each department and in common meeting places, advertise relative successes in accident prevention. A frequent unit of comparison is the number of days worked without a time-losing accident. This broadcasting of success or failure rarely fails to arouse the individual and group pride of the workers, with consequent desirable effect on their care in avoiding such accidents. Prizes, privileges or bonuses add to the effectiveness of this sort of campaign.
2. Circulation of printed propaganda, calendars, letters, bulletins, posters. Of these the last is perhaps the most effective in its fixation of attention and its lasting emotional appeal, tragic or humorous. From one viewpoint it seems that the humorous poster has a distinct psychological advantage in attracting the workers' attention and in fixing in his memory the lesson portrayed, as a necessary accompaniment to his willing remembrance of the comical aspect.

To attempt a discussion of the infinity of specific practical applications of safety plans and safety devices is far beyond the scope of this cursory survey of the field. A mere indication of general requirements of such plans and devices must therefore suffice, and may be summarized as follows:

1. Allowance of ample room between machines or stock piles.
2. Protective devices on hazardous machinery. These devices must not interfere with production operations.
3. Layout designed to avoid the crossing of arteries of material flow, thus minimizing collision hazard as well as increasing possible handling speed.
4. Accessibility of emergency cutoffs for power, electricity, steam, water, gas.
5. Adequate lighting. This is an important factor, statistical analysis showing low visibility as a major or contributory cause in a large percentage of accidents.
6. Prompt removal of wastes.
7. Installation of non-slipping walkways and stairways, provided with proper railings. Falls cause a total of 20% of all accidents.
8. Adequate emergency exits.

In a college chemistry laboratory the problem of safety administration is much simpler than in the plant, not alone because of the much smaller quantities of material handled, but because of the higher average intelligence of the operatives. In the Chemistry Department of the College of the City of New York each member of the safety committee is assigned a definite inspection area, which is submitted to his observation at frequent intervals. Besides routine inspection of the condition of safety devices, it is his duty in overseeing student work to observe potential sources of danger and recommend methods of prevention, thus, in so far as is practicable, anticipating and removing the possibility of accident. Needless to say, in any case of actual accident, conference is immediately held to decide methods of preventing possible recurrence. The last serious accident in this department occurred in the chemical vault during the summer of 1925. The stockman, preparatory to his morning sweeping of this vault, sprinkled water over the floor to lay the dust. Immediately came a puff and a sheet of flame, forcing the stockman back through the door. Other combustibles inflamed,



This type of poster is believed in some quarters to be very effective in attracting attention to its message.

the fire reaching finally a considerable store of ether and carbon disulphide, where upon there followed a seething conflagration which for a time threatened the building itself. Fire apparatus arrived, aiding the local facilities in a successful effort to confine the fire to the vault and eventually to extinguish it. Question—what started it? Collection of all available facts yielded finally the theory that a crack had developed in a large bottle containing metallic sodium covered with kerosene, and that the leaking liquid had carried considerable finely divided sodium onto the floor. The sprinkling of water on the sodium thus started the fire. By way of prevention, the stock of sodium was reduced, packed in smaller containers, and segregated, while the stock of inflammable solvents was removed outside the building to an isolated brick-walled shed.

And now, I have another magic word for you. As we started with the picturization of Inertia as the arch-enemy of industrial progress, so we now visualize

(*Continued on page 238*)

Corporation Tax Returns *the* Index *of* Chemical Business

By J. George Frederick [1]

FOR the last two or three years I have been making a specialty of studying corporation tax returns statistics, after having discovered in them a most remarkably valuable index to business conditions and business practice. I am quite aware, of course, that the figures about an industry as provided by the corporation tax returns are not absolutely correct measures of all factors, because the "legal" interpretation of profit and other elements is slightly different from the common financial one. But the difference is certainly slight, when the figures are considered as a whole for a particular industry. Furthermore, there is obtainable in no other way so many vital angles on an industry as a whole. The census deals with volume of production, wages, number of employes, etc.; whereas the corporation tax returns deal primarily with profits, and all the vital elements that have relation to profit. Since profit is—for business men as well as for the government tax collectors—the key principle of business, we are therefore able to get an entirely new prespective on business from the tax data. Every business man knows, furthermore, that the government's system of corporation auditing for tax purposes leaves little loophole indeed for erroneous figures; and opens up remorselessly the inside financial facts about business; not about a few large corporations, but all corporations.

The profits of the chemical industry were greater in 1925 than was that of all industry combined in 1921. Citing this an example of the growth of chemical sales, Mr. Frederick illustrates with dollars and cents, the important role now played by the industry in the life of the country.

Bearing in mind the great importance of these figures, therefore, let us look at what they disclose about business in general, in order that we may make a good background of comparison for the facts as to the chemical industry in particular.

Deficit-Showing Firms on Increase

The number of corporations showing a deficit has increased gradually since 1920, when there were 142,362; but of course the total number of corporations has also increased. The increase in profit-making corporations has been slightly more rapid than the increase in deficit-showing corporations. About 49,000 profit-making corporations being added since 1920 as against 35,000 deficit-showing corporations. The total amount of deficit has been declining, but only very fractionally as a grand total; although the average per deficit-showing corporation has been declining rapidly. The average deficit in 1920 was $14,254 whereas in 1925 it was only $11,042. The average profit per profit-making corporation has however declined slightly since 1920; the average profit in 1920 being $38,884, and $38,798, in 1925. If we examine now the total profits of American business after deducting the total deficits of business—thus arriving at a net balance of gain for all American business, we have a comparison as follows:—5,873 millions of profit in 1920; dropping to 457 millions in 1921; a rise to 6,307 millions by 1923; a drop back in 1924 to 5,362 millions; and in 1925 a record total of 7,621 millions. Such figures are particularly important, because, if we conceive American business as a united whole, like a consolidation with many subsidiaries, then the sums above given represent the actual net profit of the operation of all American corporate enterprise. This consolidated figure, we must remember, represents every form of American business, including agriculture, mining, manufacturing, construction, transportation and public utilities, retail and wholesale trade, professional service, amusements, hotels, banking, insurance, etc.

Profits Up 400 Million Per Year

Such facts indicate that American business is making an advance in profits of close to 400 million dollars per year, or about 7½ millions per week, or roughly about 1¼ millions per working day. Federal Reserve Bank statisticians say that over the past 50

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years there appears to have been an average annual advance in business of about 4¼%. If this is an authentic fifty year ratio of growth, then our average growth in the past five years is better than normal, for it registers from this study of business profit, about 5¼%.

Considering business as a whole from a dividend-paying basis we have another angle of approach. A total of 5,189 millions was disbursed in cash dividends; or 68% of the total net profit. 372 millions were disbursed as cash dividends unearned by the 177,738 corporations which showed a deficit. In addition, all corporations disbursed 544 millions in stock dividends.

If stock dividends are ignored, it may be said that American business in 1925 "plowed back" into the enterprise 32% of its net earnings. Taking stock dividends into account, it "plowed back" 25%.

Profits of "Big Business" Increase

As soon as one breaks up American business into various subdivisions for considerations, we have a different story. Thus, for instance, in the manufacturing field, if we select the 95 corporations which showed over $5,000,000 profit, we find that they earned an average net gain 25.4% more than in 1924; and account for 44.5% of all the manufacturing profit made in 1925, although in number they constitute only one-tenth of one per cent. Moreover, these 95 concerns increased their percentage of the manufacturing grand total of net profit by 4.6% as compared with 1924.

On the other hand, the average net earnings of the other 99.8% of manufacturing corporations which earned less than $5,000,000 declined since 1923 being nearly 11% smaller than in 1923, which was the last "prosperous" year. The average net earnings of successful manufacturing corporations in 1925 was $80,968, which is nearly $11,000 more than in 1924, and over $1,000 more than in 1923. Taking successful and unsuccessful manufacturers together, they averaged $41,738 in 1925; $31,836 in 1924; $41,912 in 1923 and $32,018 in 1922. The average deficit of the unsuccessful manufacturing corporations was $19,754 in 1925, as compared with $24,074 in 1922.

These figures for the manufacturing field show some health, for the average sum lost is growing smaller, and the average sum earned growing larger. The number of corporations showing deficits in the manufacturing field is also declining; from 35,461 in in 1924 to 34,537 in 1925. The percentage of the total manufacturing corporations showing a deficit in 1925 was 28%.

Net Profit Growing

Perhaps the most striking observation to be made about the manufacturing field is that in 1925 net profit (after taxes) increased 1% despite the fact that gross profit went "off" by 2%, compared with 1924. It was 20.6% in 1925 and 22.4% in 1924. Total expenses were reduced from 94.3% to 93.2%. and total sales dropped from 95.2% in 1924 to 93.7% in 1925. It is evident that despite decreased sales, declining gross profit, management and expense were so curtailed as to show an increase rather than a decreased profit.

Another striking and significant fact is that not only business as a whole, but also the manufacturing field increased its "income from other sources" than sales. In the manufacturing field this was 4.7% in 1924; and in 1925 it was 6.2%. In the general business field it rose from 18.7% in 1924 to 20.4% in 1925. Obviously the income resources of American business, other than sales, are growing larger, and business therefore steadier.

The discrepancies in regard to profit in relation to size of corporation are marked. One quarter of the total number of corporations make less then $2,000 a year profit; and 41.3% of all corporations do not make any profit at all. The number of all corporations which made $5,000,000 or over in 1925-26 of them in 1925—has jumped rapidly. It was only 168 in 1923; dropped to 162 in 1924; and in 1925 took a spurt of 21% in one year. The number of corporations earning a million and over was 858 in 1923; dropped to 739 in 1924 and has now risen to 917.

Profit Highly Concentrated

Taking now the group making over $100,000 profit, we find this group numbering 10,206 firms and constituting in 1923 only 4% of the total profit-making corporations, made in that year 75% of the

RATIO OF PROFIT CHANGES IN INDUSTRY

	Per Cent. of Total Showing a profit in 1925	*Change in this Per Cent. over 1924*	*Change over 1923*
Agriculture	47%	+.06%	+5.2%
Mining	28.6%	+2.1%	+.07%
Food, Beverages, Tobacco	63.9%	+1.1%	+2.7%
Textiles & Products	61.1%	+5.2%	+4.1%
Leather & Products	58.2%	+3%	+ .9%
Rubber & Rubber Goods	54.7%	+3.8%	+9.8%
Lumber & Wood Products	61%	0	—10.1%
Paper, Pulp, etc.	66.3%	+2.5%	— .2%
Printing and Publishing	65.7%	0	—1.3%
Chemicals, etc.	56.7%	+1.6%	+1.8%
Stone, Clay, Glass	61.8%	— .9%	—7.3%
Metal & Products	59.2%	+3.6%	—3.2%
All other Mfg.	58.8%	+ .9%	— .7%
Construction	63.2%	—2.8%	—1.7%
Transportation, utilities	62.9%	—2%	—4.6%
Retail & Wholesale trade	65.6%	+1%	—2.1%
Professional amusements, hotels	57.1%	—1.1%	—3.5%
Banking, insurance	63.1%	— .9%	—1.6%

profit of American business (6 1-3 billion dollars). In 1924 the same group (making $100,000 profit and upward) numbered 8,846—having contracted markedly in that year—but made 75% of the profit of that year (5¼ millions). In 1925 the showing is better still. While increasing slightly in number (10,739), though still remaining but 4% of the total number of profit-making corporations, this group earned 78% of American business profit (7½ billions). The remaining 96% of successful American corporations accounted for only the remaining 22% of profit, a little over two billion dollars. This is assuredly a very high concentration of business profit, proving beyond doubt the greater profit-making efficiency of large-scale business. The facts concerning concentration are even more remarkable when still further condensed. The firms making $1,000,000 or more profit in 1925 numbered 1,113, or about four-tenths of one per cent. of the number of successful business firms. They constitute only two-tenths of one per cent. of the total number of American corporations. Yet they made 42% of American business profit.

Chemical Data For 1925

Let us now examine the chemical industry as a special group, insofar as the available data permits. The figures are for 1925, the last year for which figures are available.

We find that the total number of chemical corporations making tax reports was 6,962. Out of this total, 3,951, or 56.7% reported a profit; the rest, 43.3% a deficit. This is a little more than two points above the average of American business as a whole, and represents a gain of almost two points over 1923, when the figure was 54.9%. In 1924, a bad year, it was 55.1%.

As to the total number of corporations in the chemical field reporting, they numbered 6,317 in 1923, rose to 6,601 in 1924 and rose still more markedly in 1925 to 6,962; a growth in number in two years of 645 corporations.

Red Ink vs. Black

The volume of gross income by those chemical corporations earning a profit in 1923 was $4,803,667,-811, which increased to $5,157,013,861 in 1924, and further increased in 1925 to $6,475,023,641. This is an increase of about 33% inside of two years. This is certainly a phenomenal gain, unmatched by scarcely any other industry.

Let us see how this compares with the chemical corporations which did not show a profit. Their gross income in 1923 was $1,304,388,021, and this declined markedly in 1924 to $733,143,717, and in 1925 decreased to $590,300,778. This represents a decline of gross income among the unsuccessful companies of over 50% in two years; thus demonstrating how marked is the success and how equally marked the failure of firms in the great basic subdivisions of business—the black inkers and the red inkers!

Let us continue the comparison from a profit or loss point of view. In 1923 the 3,472 successful chemical corporations made a total of $419,583,646 net profit. Even in the "bad" year of 1924 the successful firms made a total of $466,184,064 net profit, which in 1925 was increased to $623,277,471. This represents an increase of over 50% in profit in two years, whereas the gross income increased only 33%; which is a very significant thing to note. The unsuccessful corporations, on the other hand, showed a deficit in 1923 of $94,157,796, which in 1924 declined to $76,309,159, and in 1925 increased to $82,352,169. This represents a decline of about 12% in deficit, as against a decline of 50% in gross income; which is again a showing of importance, indicating the improving state of affairs among the unsuccessful corporations despite lower gross income.

To carry back comparisons still further we may show this table of facts about the chemical industry:

Chemicals and Allied Substances

Corporations Reporting Net Income

Year	*Number*	*Net Income*
1920	3,047	$441,369,660
1921	2,502	158,217,289
1922	3,512	461,221,420
1923	3,472	419,583,646
1924	3,640	466,184,064
1925	3,951	623,277,471

Corporations Reporting No Net Income

Year	*Number*	*Deficit*
1920	2,779	$ 96,439,756
1921	3,422	132,881,065
1922	2,605	66,158,378
1923	2,845	94,157,796
1924	2,961	76,309,159
1925	3,011	82,352,169

The figures in the above tables are a particularly vital index, showing as they do what the profit balance has been in the chemical industry every year since 1920, if we deduct from all the profit made all the deficit suffered. We see thus how a profit balance of 344 millions was whittled down suddenly in 1921 to 25 millions, and then briskly pushed back to nearly 400 millions the very next year, and by 1925 reached the record total of 540 millions. This is a profit balance which constitutes one-seventh of the profit balance of the entire American manufacturing field! It is almost half as large as the profit balance of the railways and public utilities combined, a third as large as the metal and metal products field, and larger than the profit balances of the leather, rubber, lumber paper and construction fields combined! It is about one-fourteenth of all the profit balance in all American business, including all agriculture mining, trade, banking, etc. It is a greater sum than the total of all business profit in America in the bad year of 1921. Obviously the chemical field in America is now one of remarkable strength and vitality.

(Continued on page 234)

Recent Developments In Transportation of Gases

By L. A. Belding
American Welding Company

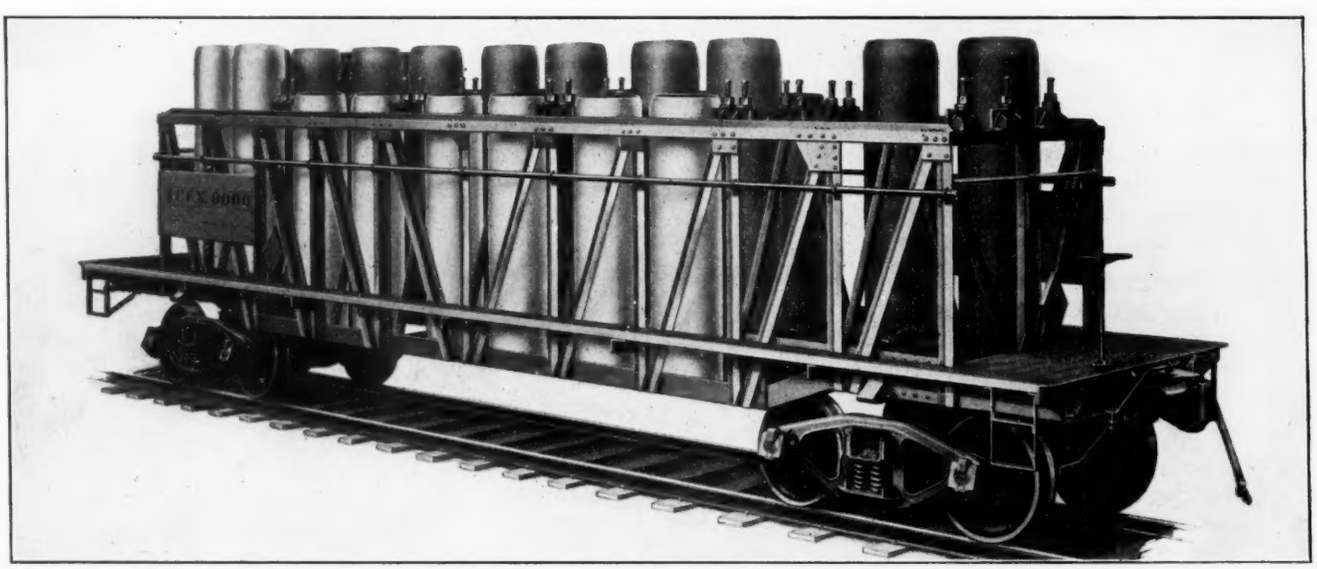
NEW products require new transportation facilities, and in strict accord with the modern economies of this age, these facilities have been developed to economically deliver these products.

In the chemical field, the newer items, such as liquid chlorine, sulfur dioxide, anhydrous ammonia, industrial petroleum gases, tetraethyl lead, etc., are shipped as such without dilution or admixture of any inert, useless materials to act as the vehicle. In other words, "The wheelbarrow is not added to the reaction." Gases with high vapor pressures, volatile liquids, poisonous liquids, and extremely valuable liquids have demanded special tank cars for their transportation, and the purpose of this paper is to give a description of recent developments of such special cars.

Tank car developments really date from January 1, 1903 when the Master Car Builders' Association drew up some regulations termed "Recommended Practice" for repairs of cars then in use. These were very broad regulations, demanding that tank cars built thereafter be provided with steel underframes. There were progress reports made by this same body in 1904 and revisions were made during 1906, 1907, 1908, 1909, and in 1910 this paper of rules was advanced and called a Standard. During 1912 new specifications were added to the recommended practice covering special cars, such as liquid chlorine gas cars. These were very general specifications saying that the chlorine cars were to be tested at 300 pounds per square inch, and insulated, and were classified as "Special Tank Cars" with each design to be submitted to the Master Car Builders' Association, for criticism and approval. During the year 1914 provisions were incorporated making certification to the Bureau of Explosives necessary. Then came the war with increased shipping facilities demanded and many new commodities to be shipped in quantities, including the newer compressed gases such as chlorine, and all tank cars were classified in 1916 by the Master Car Builders' Association as follows:

Class I and Class II cars were revised and specifications for Class III and Class IV cars were added. Class I cars covered all cars built prior to 1903, and Class II cars covered all cars built from 1903 to May 1917. Neither of these classes of cars are built any more.

Class III cars covered all cars built after May 1,



The most recent development of the Multi-Unit Car. This type car may be utilized for carrying tanks of different sizes making it available for transportation of compressed gases of varying weights.

1917, designed for liquids having a vapor pressure not over 10 pounds per square inch at 100 degrees F., and made with a test pressure of 60 pounds per square inch.

Class IV cars were designed for more volatile liquids than the Class III car. For this reason it is an insulated car for liquids having a vapor pressure of not over 20 pounds per square inch at 100 degrees F. and with the tank tested at 60 pounds per square inch. During 1927 a modification of the Class IV car was made to provide for liquids having higher vapor pressures and was designated as the Class IV---A car, with tank made of heavier construction and intended for liquids having a vapor pressure not to exceed 33 pounds per square inch at 70 degrees F. This car has application for transportation of ethyl chloride and the lighter industrial petroleum gases. For all volatile liquids and gases having higher vapor pressure than 10 pounds per square inch at 100 degrees F. which is the prescribed limit for Class IV cars, and for such liquids that have not more than 100 pounds per square inch at 70 degrees F., the Class V car has been developed and used. The Class V car is peculiar in that it has a forge welded tank with no bottom outlet, and is tested at 500 pounds per square inch.

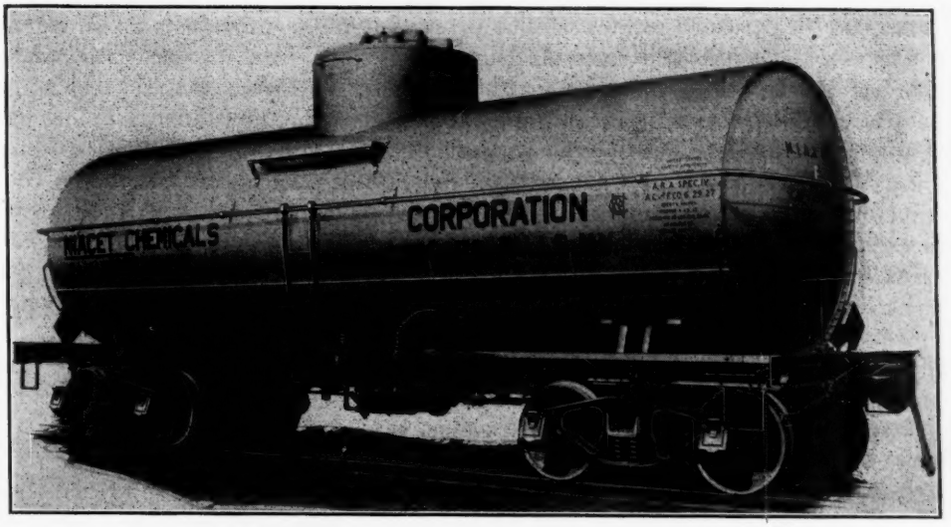


Figure 1: The Class IV Car, used in transporting volatile gasolines and chemicals such as Aldehyde, loaded at low temperature.

Another very special tank car has been developed, designated as the Class VI tank car now in use by the Army and Navy of U. S. A. for the transportation of helium. This car has tanks made of seamless forgings, mounted uninsulated, and designed for non-liquefied and noninflammable gases with pressures not exceeding 2000 pounds per square inch at 70 degrees F.

When tank cars first came into being they were made with wooden underframe and with wooden head blocks to hold the tank in place, without air-brake mechanism, and with a construction that would not endure under modern railroading conditions. Gradually this construction was improved by adding steel to replace wood, using first a steel center sill and then adding steel bolsters for both truck and body. As indicated above such cars have been designated as Class I and Class II, but are no longer built.

The tank cars which are used in the greatest numbers and which is seen very frequently on the railroads, is now designated as the Class III tank car and used by the thousands for transporting petroleum products, alcohol, molasses, etc. This modern transportation facility is noteworthy for its very heavy, rugged steel construction with diagonal bracing at the end sills, cast steel side frames on the trucks, heavy center sill, generous air-brake system, etc.

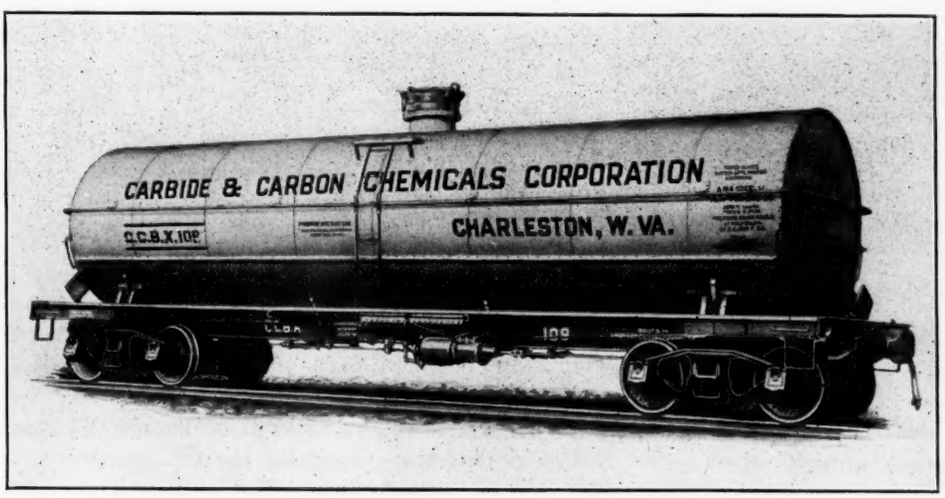


Figure 2: A more recent development than Class III and IV Cars, designed for use in carrying material having vapor pressure of not over 100 lbs. per inch at 70° F, such as propanes and butanes.

The riveted steel tank used on such cars is tested at 60 pounds per square inch. This tank is fastened to the center sills by means of center anchors, basic patents on which expired August 1921. The tank is further held in place by steel straps fastened directly to the center sill. In contrast to the earlier types of cars, there are no head blocks. The dome on the tank provides for the requisite expansion of the lading. There is a bottom outlet which may or may not be steam jacketed, and

there may or may not be steam coils, depending on the use to which the car is to be placed.

When the lading must be held within close temperature limits during transportation, the car is insulated on the outside and is then designated as a Class IV car (see Figure 1) and is used for transporting the more volatile gasolines, and for special uses such as carrying liquid clays which must not freeze during transportation, or for commodities such as acetaldehyde loaded at low temperatures and insulated to prevent temperature rise.

For commodities having vapor pressures beyond the limits set for the class III and Class IV tank cars, there has been developed the Class V tank car, which carries materials having vapor pressures not exceeding 100 pounds per square inch at 70 degrees F. The Class V tank cars differ from the Class III and Class IV tank cars designated above in many particulars, as follows:

(a) The tanks for the Class V tank cars are forge welded by the water-gas process, giving a smooth seamless construction, and are tested at 500 pounds per square inch.

(b) The tank plates vary with the commodity and size of tank, from ¾-inch thickness to 1-¾ inch thickness. Forge welded tanks are insulated with four inches of cork applied on the outside and then a light metal sheathing is placed over the cork to protect it.

(c) In further contrast to the Class III and Class IV cars, the Class V tank car has no expansion dome for the regulations prescribe loading densities for commodities so that the tank of the Class V tank car will be only partly full, thus making the tank itself the necessary "Expansion Dome" to take care of changes in volume of lading due to changes in temperatures.

(d) The Class V tank cars have no bottom outlets but are filled and emptied through valves and education pipes located in the manhole cover plate.

This type car is built in a variety of sizes for different commodities. For instance, Figure 2 shows a Class V tank car used for the transportation of lighter hydrocarbons, such as tank propanes and butanes. The forge-welded tank is 85″ I. D. by 36′7″ long having volumetric capacity of 10,500 gallons and the tank alone weighing empty 42,000 pounds. The tank is made of flange quality steel plates 1¼-inch thick, and tested at 500 pounds per square inch. This car will carry 40,000 lbs. of propane.

The chlorine industry uses more Class V tank cars than any other single industry, and there is a type of Class V tank car used for carrying 30,000 pounds of liquid chlorine. The forge welded tank in this car is 52-½″ I. D. by 28′ 10½″ long, made of ¾-inch flange quality steel, and has a volumetric capacity of 422 cubic feet, the tank alone weighing empty 13,500 pounds. Recent activities in the manufacture of synthetic anhydrous ammonia have demanded transportation facilities, and a Class V tank car has been developed for handling this commodity. This type Class V car has a forge welded tank 70″ I. D. by 34′ 1″ long, made of flange quality steel plates, 1-inch thick, and having a volumetric capacity of 6,700 gallons, with the tank weighing empty 31,500 pounds. This car will carry 30,000 pounds of anhydrous ammonia.

Figure 4: Method used in emptying each container individually by means of pipe lines connected to a header on the car side.

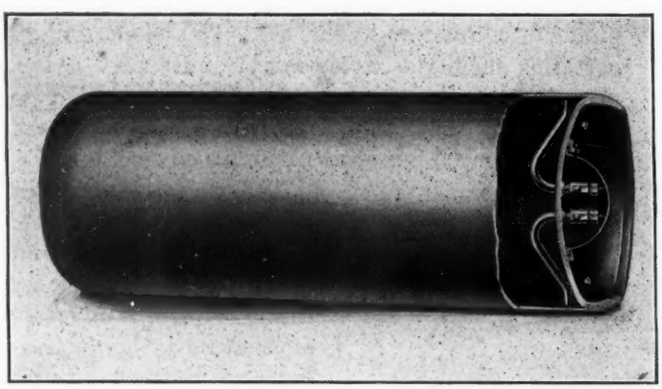


Figure 3: Sectional View of Rowland Container showing the valves and plugs described in the article.

All constructions described and pictured above dealt with single tanks on cars, while more recently there has come into use a multiplicity of tanks on cars.

This newer tank car with its fifteen Rowland One-Ton Containers, (Figure 3) in very general use for the transportation of chlorine and sulfur dioxide, and getting into more general use for carrying anhydrous ammonia and liquified hydro-carbon gases, had as its forerunner wooden tanks mounted on wooden underframes, used for the transportation of acids and some food stuffs. The multi unit car with its Rowland Containers consists of an underframe of all steel construction designed in accordance with

the very latest practices for the extremely severe service on railroads of this day, and having a special framework mounted thereon for carrying the containers, and provided with clamps for fastening the containers in place, all of which is clearly illustrated in the picture.

The Rowland One-Ton Container A New Development

A more recent development of this multi-unit car is shown in the illustration on the first page of this article, showing thirty (30) of these tanks on a car, and giving a net load of 60,000 pounds of chlorine or sulfur dioxide, or 30,000 pounds of anhydrous ammonia, or liquefied hydro-carbon gas. This is a very recent development and this car is destined to be a very popular design, because it is applicable to transportation of many liquefied, compressed gases, merely by putting on different sizes of tanks.

The Rowland One-Ton Container is made of flange quality steel plates and is roll-selded throughout by a unique process, resulting in a tank that is seamless. The tank is provided with filling and emptying pipes, valve protection bonnet, fuse plugs, etc., all built and tested in accordance with Interstate Commerce Commission Specification No. 27. Figure 4 shows a scheme of emptying each container independently through pipes leading to a header mounted along the side of the multi-unit tank car, which again pictures the very splendid engineering being done on the modern transportation of high-pressure gases.

There is one more class of tank car which is known as Class VI tank car, used for transportation of non-liquefied and noninflammable gases having pressures not exceeding 2,000 pounds per square inch at 70 degrees F, and this pictured as figure 5.

This Class VI tank car has three seamless forged steel cylinders mounted thereon, each cylinder being 54″ diameter, tested at 3,000 pounds per square inch, and an operating pressure of 2,000 pounds per square inch. The cubical contents of these three forged cylinders is 1,516 cubic feet, in comparison to the Class V chlorine car mentioned above, with a cubical contents of 422 cubic feet, or the larger Class V anhydrous ammonia tank car having a capacity of 1,260 cubic feet. This car is used by U. S. Army and U. S. Navy for the transportation of helium gas, carrying approximately one ton of gas, and the car weighing empty, approximately 100 tons.

Construction Details of Class VI Car

As for details of construction, note that these tanks are fastened to the underframe by body bolsters only without any center anchors; that there is no center manhole; that filling and discharge valves are mounted under protection caps on the ends of the cylinders; that the safety device consists of a frangible disc of special design, so carefully worked out that these discs will rupture within plus or minus 5% of the desired rupture pressure.

The whole Class VI tank car is of very unique construction, but shows very definitely the application of modern engineering to provide the requisite transportation facilities to keep pace with our modern chemistry.

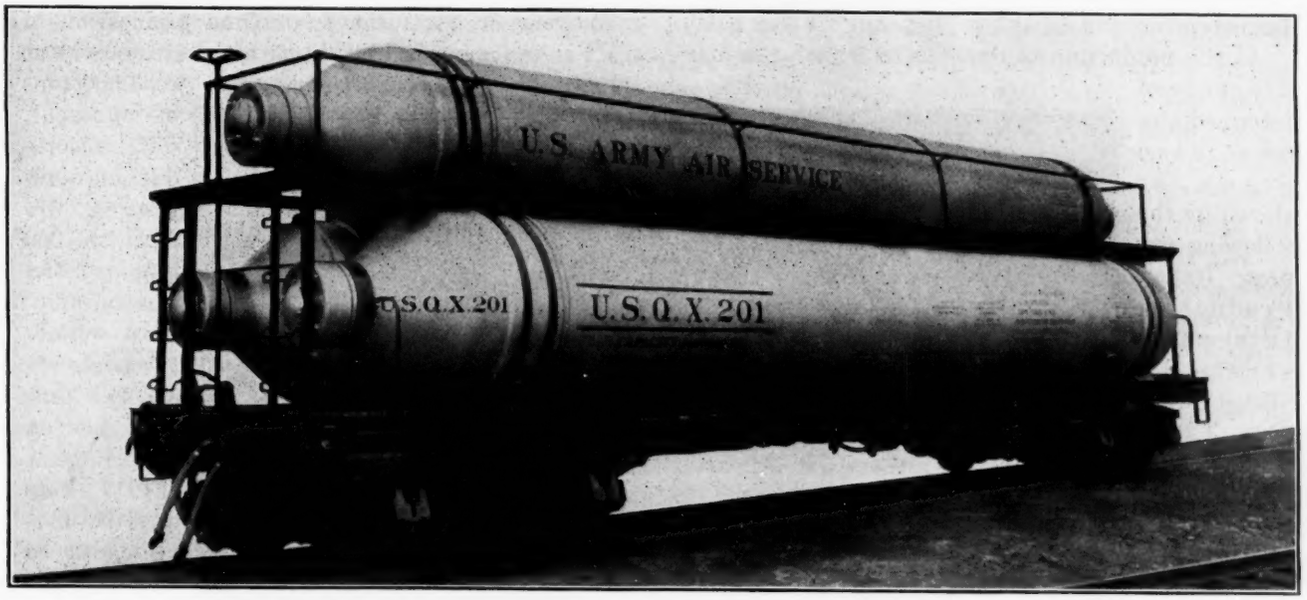


Fig. 5: Car now in use by War and Navy Departments for transporting helium gas. Note the unique but rugged structure of the individual tanks held to the car by body bolsters only. There is, of course, no center manhole, the filling and discharge valves being mounted under protection caps at the end of the cylinders. The contents of these cars is 1516 cubic feet, affording a much increased capacity over the Class V type of car.

ITALY—

A New Chemical Factor

By Dr. Carlo Padovani

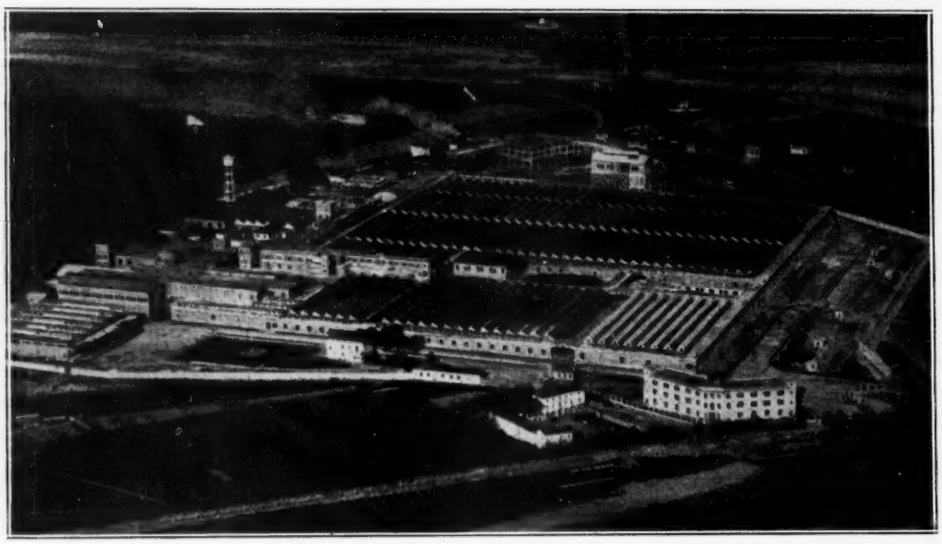
Professor, Industrial Chemical Institute, Polytechnical School, Milan.

ITALIAN chemical enterprise, as in other countries, has shown great progress since the war. Without too much patriotic boasting, we may say that there has been a greater advance in Italy than in almost any other country, since minor industries now assume major economic importance, and some which did not exist at all, have a real place in Italian industrial life.

This is especially true of the syntehtic organic and dye industries. In 1914, Italy wrote no figures at all in the international statistics of coal-tar dyestuffs. In 1925, she produced 5,000,000 kilos or three per cent. of the world's supply. In 1926 the manufacture rose to 6,300,000 kilos, an amount sufficient for 74% of the national needs and allowing an export of 350,000 kilos. Sulfur black, made from chlorbenzene by conversion of this chemical into dinitrochlorbenzene and into dinitrophenol is the most important dye. Cesano Maderno (Milan) have just erected a new plant fully equipped with all modern improvements and capable of producing six tons a day.

As the production of dyes has increased, the manufacture of intermediates has also grown, as shown by the following figures: Italian Production Intermediates: 1918, 800,000 kg; 1922, 1,700,000 kg.; 1924, 2,400,000 kg.; 1925, 3,600,000 kg.

The greater part of this production is represented by chlorobenzene and aniline which amounts to over one thousand tons, followed by H. acid, p-naththol, p-nitroaniline, and benzidine. The latter is obtained by a purely Italian process using sodium amalgam.



Rayon factory of Snia Viscosa at Venaria Reale near Turin. This is the largest rayon plant in Europe with a capacity of 66,000 pounds per day.

Fertilizer Production Accelerated

An enormous development has also occurred in the synthetic fertilizer industry, meeting the urgent agricultural needs of the country. In 1914, Italy made only 16,000 tons of calcium cyanamide, equivalent to about 3,000 tons of nitrogen. To-day, not only has the production of calcium cyanamide risen to 20,000 tons, but a great synthetic ammonia industry has also sprung up. For the most part, Italian patents are used which employ electrical energy for heating the catalysis chamber and for the production of electrolytic hydrogen.

The production of synthetic nitrogen in Italy will reach 41,000 tons for 1928. If this synthetic output be added to the figures for ammonium sulfate from coke-ovens or gas furnaces or from gasification of turf lignite (counting 16,000 tons of sulfate equivalent to 3,500 tons of nitrogen), the total production of nitrogen will reach 65,000 tons or more. The consumption of nitrogen was 34,648 tons in 1926 or double that of 1913. This quantity corresponds to 2.08 kilos per acre cultivated, a much smaller amount than

the other European countries use, but Italian farmers are fast being educated to use more nitrogenous fertilizers.

The production of superphosphates has also grown since the war, increasing from 951,000 tons in 1914 to 1,312,000 tons in 1925. In this field Italy ranks as the third largest producer in the world, following the United States and France.

Likewise, the sulfuric acid industry has grown. In 1914 the Italian and world production of sulfuric acid calculated in hundredweights as monohydrate was:

Italy	4,500,000-6.3%
Other countries	68,000,000-93.7%

In 1925 it was:

Italy	7,500,000-7.5%
Other countries,	92,500,000-92.5%

The growth of the sulfuric acid industry, which is admittedly one of the best signs of chemical development has been more marked since the war in Italy than in any other country. Since then, the Italian manufacturers have doubled the amounts of monohydrate acid to 8,500,000 hundredweights. (Of this production 91% was produced as 50-52°Be acid by the lead chamber process; 9% as oleum with 25, 30 and 60% sulfur dioxide). Half of this production is now used in the making of superphosphates.

Caustic Soda Output Tripled

Italian production of sodium carbonate by the Solvay process, exceeds Italian consumption. The output in 1926 was 800,000 hundredweight and the consumption about 750,000. Nevertheless, about 200,000 hundredweight of carbonate were imported for the preparation of caustic soda. In fact, although the plants for electrolytic soda have tripled their capacity since the war, they are still insufficient for our domestic needs, which were about 800,000 hundredweight in 1925 due to the demands of the artificial silk industry. In 1924, the electrolytic soda plants produced 190,000 hundredweight of caustic, about 230,000 more were produced from carbonate, and 150,000 were imported. The electrolytic soda process—which may be considered typically national, for it starts with native raw materials and uses water power—is not entirely in competition with the imports or with the carbonate methods. Further development of this industry will depend on the market value of the chlorine.

The utilization of this by-product chlorine is one of the greatest problems of Italian chemical industry. The manufacture of chlorates, which during the war reached 50 tons daily, has rapidly fallen off. The chlorine is at present chiefly used in the production of calcium and sodium hypochlorites, synthetic hydrochloric acid, organic chlor-derivatives (especially chlor-benzene) etc. The manufacture of cellulose or paper pulp by chlorination of hay, alfalfa, etc., has been dropped from both laboratory and industrial experiments on the part of the Societa Elettrochimica Italiana and also the Elettrochimica Pomilio. It is not successful just at present, not only on account of technical and economic difficulties but also because of prejudices in the old Italian paper industry which are difficult to overcome. However, I believe that some day this process will have a position of great importance in the industry.

Rayon Growth Remarkable

The vast development in recent years of the Italian artificial silk industry is well known. It has increased pre-war production tenfold. The output is 13,500,000 kilos making Italy the second in the world production, on a par with Great Britain and following the United States.

New progress has also been made in the organic acid industry, especially for citric and tartaric acids, which are extensively exported, as well as in the industries for liquid gas, oxygenated water, magnesium salts, sodium and barium sulfides, carbon disulfide, pharmaceuticals, etc.

The yearly investment of capital in the chemical industry is reckoned as 4,000,000 lire, half of which is spent in the artificial silk industry, a quarter of the total in the fertilizer, and the remainder divided among the others. The workers employed in chemical plants total about 130-140,000 reckoned in round numbers and the power is equal to more than 250,000 horse power.

Effects of Readjustment

The general industrial and financial readjustment, prevalent throughout the world, which was augmented during the last two years in Italy by the revaluation of the lira, has naturally affected the chemical industry. However, this industry has survived better than some others and is already finding its equilibrium. A typical example may be had in the artificial silk industry, which is rapidly picking up after the slow period in 1926. While in 1926 Italy's share in the United States imports fell from 33.3 per cent. in 1925 to 24 per cent., bettered by Germany and Holland, in December 1926 and the first part of 1927, Italy resumed a position in the first ranks, distantly followed by France. The loss of the English markets, on account of protective tariff, has been compensated by a gain in German markets which take 25 per cent of our exports and open up new fields in the Orient.

The unemployment in the chemical industry during the last year varies from 11.8 to 15 per cent. which represents only 1.5 to 2 per cent. of the general unemployment in the Italian industries.

The values of the exports and imports of chemical products in the first half of 1927 compared with the first half of 1926 were as follows:

	1st half 1926	*1st half 1927*
Imports	923,703,609 lire	919,739,365 lire
Exports	330,748,469 lire	310,740,688 lire

(*Continued on page 228*)

Continuous Thickening *in the* Chemical Industry

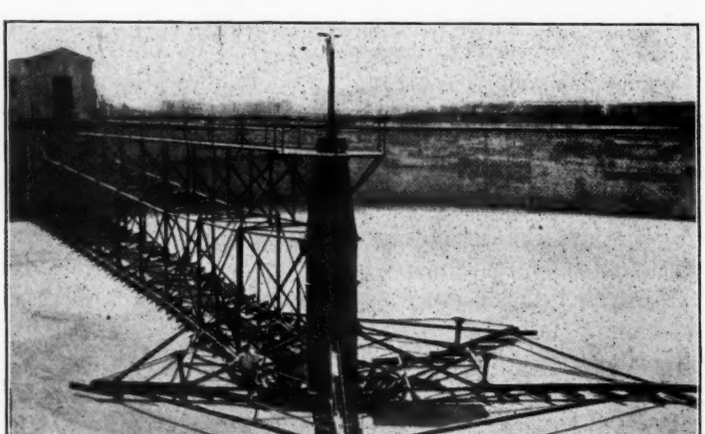
By Anthony Anable
The Dorr Company, Inc.

IN the chemical industry there are few operations which are more commonly practiced than leaching and precipitation. In either case a mixture of solids and a liquid is the resultant, the handling of which and its preparation for subsequent treatment call for special care and the application of the best in chemical engineering practice. If it is a case of precipitation, the subsequent use of the precipitate will almost always call for a product from which the greater part of the solution has been removed. If, on the other hand, it is a case of leaching or dissolving, subsequent treatment of the solution formed will necessitate the removal of the insoluble residue and clarification of the solution. In either case, thickening preferably continuous thickening, is the method frequently used by chemical engineers.

The problem being a common one and one which has been the subject of a considerable amount of technical study, the executives of chemical enterprises should be interested in the general underlying principles and applications of continuous thickening to no less an extent than their technical staffs. It is accordingly the purpose of this article to discuss this subject in a general way without going into the technicalities to any greater an extent than is necessary.

The term "thickening," as it implies, means the removal of excess solution from a dilute mixture of solids and solution by taking advantage of the natural tendency of the solid particles to settle to the bottom of a tank in which the mixture is maintained in a quiescent state. This results in the formation of thick, dense saludge in the lower portion of tank and a zone of clear solution directly above which maybe siphoned off, leaving the concentrated solids in condition for further processing. In continuous thickening special equipment is used for carrying out the separation of the solids from the solution on a continuous basis, so that, with a continuous feed of dilute material, a separation may be made resulting in a continuous discharge of thickened material from the bottom of the tank and clear solution from a point near the top. In the case of certain types of continuous filter-type thickeners the solution is all drawn thru a filter medium although the cake is removed as a thick sludge from the tank bottom.

Unit processes such as continuous thickening, have been developed to a high state of perfection for carrying out the separation of solids from a liquid. If it is desired to recover precipitated material from the solution in which it is formed and reduce it finally to a bone dry condition, it will generally be found that the cheapest way of accomplishing this will require three different types of equipment operating in series and each one handling the material through the range of its maximum efficiency. Continuous thickening will be found to be most effective in the first stage of dewatering, receiving as its feed the mixture directly after precipitation and passing on to the next step a sludge in the thickest form to which it will settle by gravity. The continuous thickener, having removed all of the solution which can be effected by the gravitational subsidence of the solids, is generally followed by continuous vacuum filtration, the second stage in the complete dewatering procedure. The sludge from the thickener is fed to the vacuum filter from which a filter cake is discharged which has had the greater part of the moisture removed by suction. The final removal of moisture is effected in a drier, in which the products of combustion of an oil, coal, or gas furnace are brought into direct or indirect contact with the filter cake.



An actual installation of a 200 foot Traction Thickener showing the rugged construction of the mechanism.

On a cost per ton basis continuous thickening is without question cheaper than filtration or drying. Its use ahead of filtration is not only desirable from a cost standpoint, but also because vacuum filters generally give their highest capacities and produce their driest cakes when the materials fed to them have been previously thickened. Likewise it will be found true that the unit cost of vacuum filtration is much less than drying and that a filter preceeding the drier will greatly increase the capacity of the drier and, obviously, reduce the amount of fuel required. It is therefore a well known rule in dewatering problems to first reduce the moisture content as far as possible by thickening, then remove as much more moisture as possible by filtration and finally use the drier for the removal of the remaining moisture which cannot be eliminated in either of the other two ways.

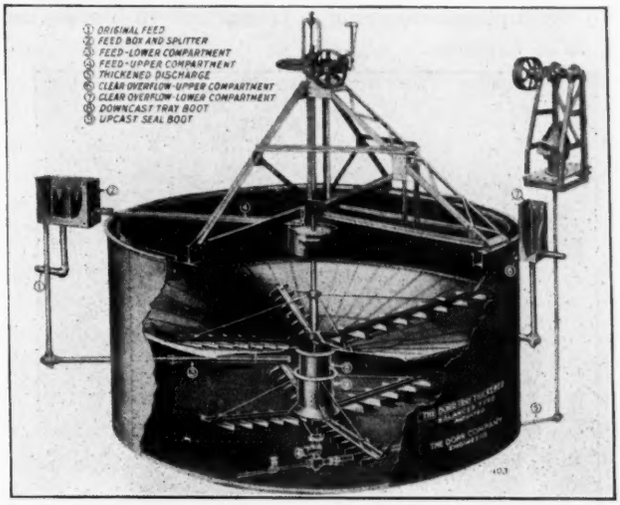
The chemical industry is indebted to the older industry of metallurgy for the development of much of the standard equipment in use to-day at chemical plants. The cyanide process for the recovery of gold and silver, introduced in 1886 by McArthur and Forrest, is essentially a chemical process, involving, as it does, the dissolving of the previous metals by a solution of potassium or sodium cyanide. For the reduction of the ore to a finely divided powder, the mixing and leaching of the ore with the cyanide solution and the subsequent removal of the gold bearing solution from the leached ore, much ingenuity was displayed in the development of continuous equipment. The continuous thickener, the vacuum filter, the agitator and the tube mill, all of which are to-day common in chemical practice, were first introduced and finally perfected in the field of metallurgy, notably in connection with the treatment by the cyanide process of the ores which contain gold and silver.

Dorr Originator of Thickener

The continuous thickener, which led to mechanical improvements in the practical application of the cyanide process, is the invention by Mr. J. V. N. Dorr, a metallurgical engineer who at the time was a partner in the Lundberg, Dorr & Wilson mine at Terry, S. D. It consisted essentially of a cylindrical tank fitted with an overflow connection for clear solution at the top and a slowly revolving mechanism equipped with rakes attached to radial arms for continuously scraping the settled solids to a discharge point in the center of the tank bottom. The feed, consisting of four or five parts of gold bearing solution to one part of fine ore, flowed in a steady stream into a semi-submerged cylindrical well at the center of the tank in order that it might be introduced below the layer of clear solution near the top and not disturb the tank contents. The separation proceeded continuously, clear solution being taken off at the top while a thick sludge at about 50% moisture was removed from the bottom with a diaphragm pump.

The continuous thickeners on the market to-day may be divided into two main classes. The first class consists of those which are straight sedimentation or settling units, depending entirely upon the settlement by gravity of the particles in the feed to effect the desired clarification of the solution and concentration or thickening of the solids. The second class consists of those thickeners which operate on a combination of the filtration and settling principles, all of the solution being drawn through a filter medium for clarification purposes, but the solids being periodically discharged from the filter medium and withdrawn from the bottom of the tank.

For straight clarifying and dewatering problems as well as for continuous counter current washing, continuous sedimentation thickeners of various types are available. The Dorr Traction Type Thickener, as its name implies, has a rotating mechanism which is driven by a traction wheel on the end of a radial



Tray Type Thickener, with its facilities for making use of up to seven compartments when floor space is at a premium.

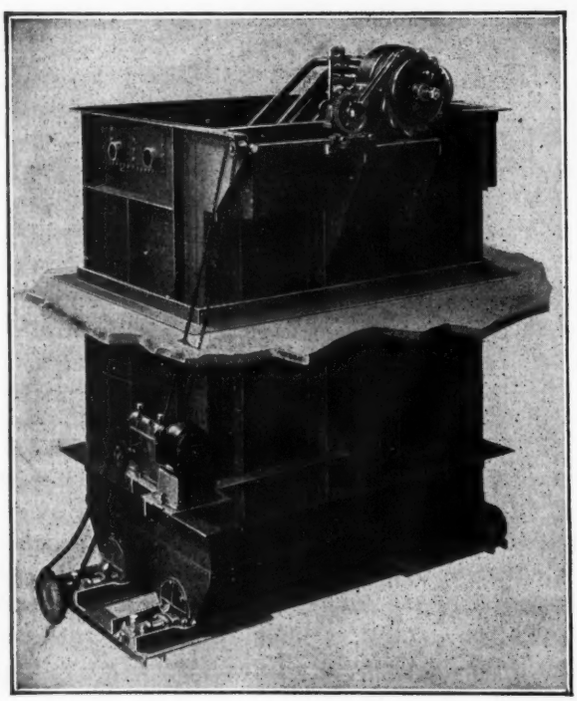
truss from which the rakes are suspended. The wheel runs either upon a rail laid on the tank top or else directly on the top of the tank. Power is brought in through the central column connection with the motor being by means of slip rings and brushes. This extremely rugged machine is especially adapted to heavy tonnage requirements and is available in sizes ranging from 6′ to 325′ in diameter.

Where floor space is at a premium and large capacity is required, the Door Tray Type Thickener is frequently used. In this unit the tank is subdivided into from two to seven superimposed settling compartments by steel trays. Each compartment so formed is provided with a raking mechanism driven from a single vertical shaft at the tank center. Inasmuch as each compartment operates substantially as an individual thickener, each tray added increases the capacity per unit of floor space about 100%.

For the handling of chemical solutions which attack iron and steel special materials of construction may be used with the simpler type R. Dorr Thickener. Wood tanks or lead lined ones and either wood or

lead covered steel mechanisms meet the greater number of such cases, while many other materials of construction may be used if desired.

The principle of operation is the same in the case of these three types and is shown diagramatically in the illustration showing a sectional view through the settling zones of a Door Thickener. A layer of clear solution extends from the surface to the lower end of the feedwell. The incoming feed displaces the layer of clear solution into a circumferential overflow launder or through at the inside top of the tank from which it flows through a pipe to whatever further treatment may be required. The solids suspended in the feed settle towards the bottom of the tank, becoming more and more concentrated as they settle and accordingly passing successively through zones or layers, having liquid to solid ratios ranging from that of the dilute feed to that of the thick, dense sludge which is continuously pumped from the bottom. No attempt will be made in this article to discuss the



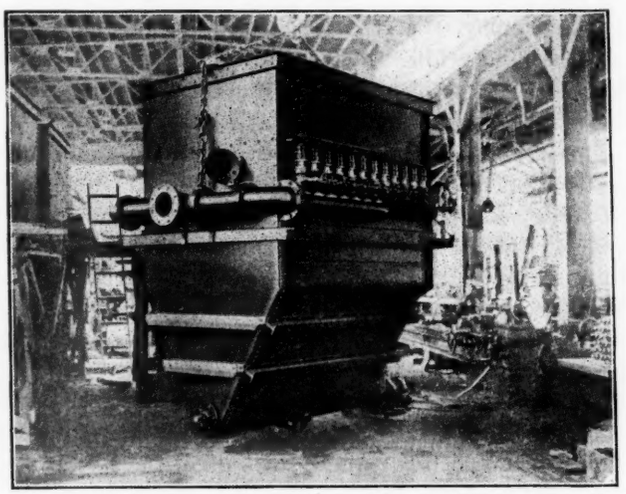
The Oliver Borden Thickener which operates on a combination filter and thickener plan.

tests made and formulae applied to determine the proper diameter and depth of tank for a given settling problem.

Other Types of Thickeners

While the word "thickener" was originated by Mr. Dorr to describe the continuous sedimentation unit which bears his name, there have been developed in the last few years three of four makes of filter-type thickeners. These machines differ from the straight sedimentation thickener in that, except in certain special cases, all of the solution is drawn through a bed of granular fine solids, or through a canvas filter medium. The filter-type thickener has its chief field of application in clarifying problems where the amount of solids to be removed is small and the solution to solid ratio in the feed is high. Solids which approach microscopic fineness or are of a gelatinous, slow settling nature may be removed effectively from solutions by using machines of this type. Only three makes of filter-thickener will be described in this article, although there are a few other makes on the market which differ from these in only minor details.

In the Hardinge sand filter the bottom of a cylindrical tank is covered with a layer of fairly fine sand or other material which forms a porous filter bed with



An example of a distinctly filter type of thickener—the Sweetland unit.

a drain to one side of the center. At the center, a well extends through this porous bed, with an outlet at the bottom of the tank which is separate from the drain under the porous bed. A steel truss across the top of the tank supports a mechanism which consists of a central vertical shaft with a spiral scraper attached to its lower end.

The solution to be clarified is fed into the tank and filtered through the porous bed on the tank bottom, either by the pressure of the static head of solution in the tank or else, by applying vacuum through a suitable connection below the false bottom upon which the porous bed is laid.

The spiral scraper mechanism is slowly revolved and either continuously or intermittently cuts off a minute layer of the filter bed and accumulated fine solids in order to keep the surface of the bed clear and insure a steady rate of flow of filtrate. The shaft carrying the spiral is gradually lowered as the mechanism revolves so that the material collecting on the bed may be removed with a portion of the sand bed through the well at the center.

The porous filter bed, which is the distinguishing feature of the Hardinge machine, rests on a false bottom made up in one case of studding slats, cocoa matting and burlap, and in the other of coarse rock with successive layers of fine sizes, so arranged that each size makes a bed for the next smaller until the filter medium itself is reached.

The Oliver-Borden machine operates on a combination of the thickener and filter principles. The tank, which is of rectangular horizontal cross section, is made up of two compartments, each having a V-shaped bottom fitted with a multi-bladed mixer conveyor. Suspended in this tank in a vertical position are a number of perforated steel tubes, the surfaces of which, with the exception of the heads, are covered with filter cloth wrapped spirally with wire. The interior of each tube or group of tubes is connected by a header pipe to an automatic rotary port valve which applies either suction or positive air pressure. The automatic valve is provided with several openings or ports and is slowly rotated, the speed of rotation determining the cycle or duration of each consecutive operation. Operating in conjunction with the automatic valve and synchronized with it is an automatic blow timer for the control of the application of air.

During operation, the tank is kept full of pulp with the tubes completely submerged. Suction is applied to the tubes via the automatic valve by a dry vacuum system causing each group of tubes to act as a number of individual vacuum filters. Cake accumulates on the filter cloth while filtrate solution is collected in a receiver. At regular intervals and in rotation the suction on each tube or group of tubes is cut off by the action of the automatic valve, and air pressure is suddenly applied by means of the blow timer. The compressed air reverses the direction of filtrate flow for an instant and causes the solids to drop from the surface of the cloth to the bottom of the tank from which they are conveyed by the mixing conveyor to the tank outlet.

The Sweetland Unit is also distinctly a filter type thickener as the solution to be clarified is drawn through a number of tubular shaped filter elements suspended in a rectangular tank. These tubular elements are connected to two manifolds, one located on either side of the tank, through shut-off valves and sight glasses. The two manifolds are brought together at one end of the tank and are directly connected to the suction of a rotary reversible wet vacuum pump. The tank has a V-shaped hopper bottom in which is located a right and left hand flight scroll, driven by a motor, which moves the thickened material towards a discharge connection in the tank center.

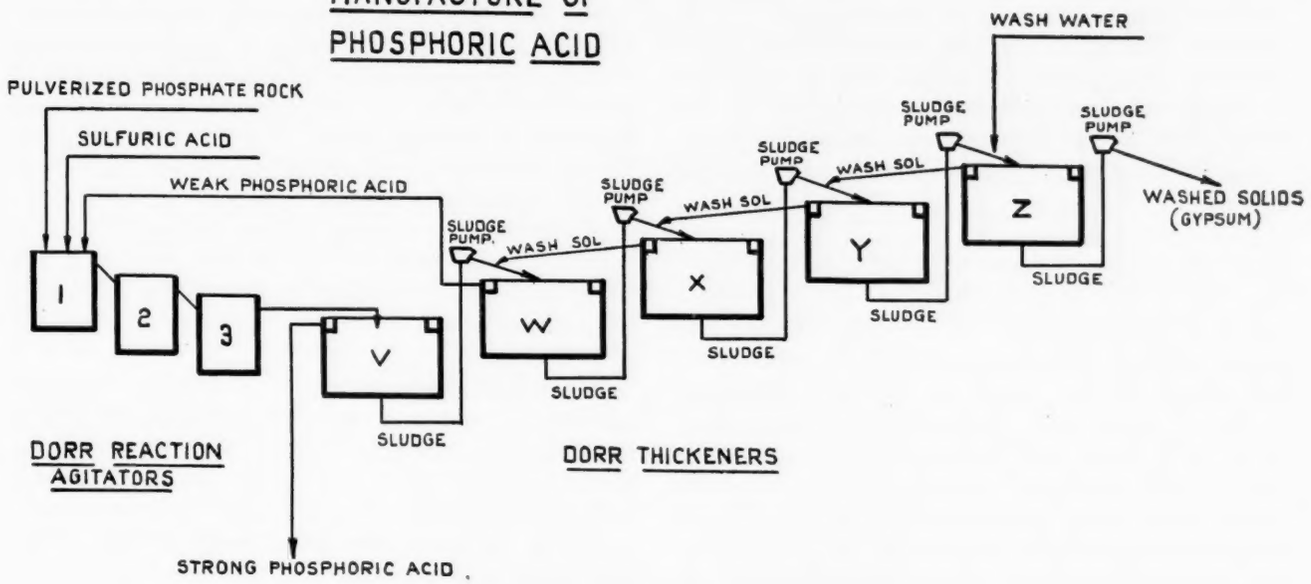
After the tank has been filled the vacuum pump is started through a small motor which actuates the reversing drum switch. Clear filtrate is thereupon drawn through the pump and discharged to subsequent treatment. This action continues until the reverse running contacts fingers on the rotating drum switch make contact. The vacuum pump then changes its direction of rotation, producing a slight pressure which discharges the cake of solids from the filter elements. The cake then settles to the bottom of the tank and after a few seconds the reverse motion of the vacuum pump ceases and filtration is resumed with the pump rotating in its normal direction. These alternate movements continue indefinitely until the pump is stopped by opening the main power line.

The sludge or cake, removed from the filter elements, settle into the hopper bottom of the tank, is moved to the central sludge opening in the bottom by the scroll and is discharged by a spigot or pump.

The use of the Dorr Thickener led to the origination of a new continuous method for washing the solids

(Continued on page 230)

MANUFACTURE OF PHOSPHORIC ACID



DIAGRAMMATIC FLOW SHEET OF COUNTER CURRENT DECANTATION PLANT

What *pH* Means In Chemical Production

By W. A. Taylor

Maximum yield is the Keystone of successful chemical production and it depends greatly upon control of operations. This mysterious symbol is the measure of acidity or alkalinity as the thermometer measures heat and cold. Dr. Taylor has written this article to give the executive a working understanding of this tool for bigger production.

EVERY chemical manufacturer realizes that in order to meet competition he must keep the manufacturing cost down to the lowest possible figure, and that he must turn out a good product of absolutely uniform quality. To accomplish this he must employ accurate control methods both in raw materials and in process, to make sure that the operation is run under exactly the same conditions at all times.

Among these methods, that for the control of acidity and alkalinity is one of the most import—certainly the most universal. The imperative need for an accurate method is therefore apparent.

It has long been known that old methods of testing by titration and papers, while far better than nothing, often give inaccurate and misleading results which are not therefore satisfactory in most cases for precise control. The introduction of Hydrogen Ion Control supplied this accurate method. For a number of years this was considered of more theoretical than practical value and it is only comparatively recently that this simple and valuable method has been used in industry.

One very good reason for this is no doubt the fact that much of the literature on Hydrogen Ion Control has been written from a highly technical standpoint and gives the impression that the method is extremely complicated, so that only a man highly trained along this specific line is required for its application. As a matter of fact it is almost as simple to make a determination of Hydrogen Ion Concentration as it is to make a measurement of temperature, and plant foreman are now using the term "pH" with just as much intelligence as they are the terms "degree Baume" and "degree Fahrenheit." Since the simplicity of the method has been realized, it has been adopted in all types of commercial work with remarkably gratifying results.

Ten gallons of water at 70%C contains a greater *quantity* of heat, (for example it will melt more ice) than will one gallon of water at the same temperature. The *intensity* of heat, which is measured by the temperature in degrees Fahrenheit or Centigrade, is however the same in both.

Analogously, titration determines the *quantity* of acid present, that is 10 cc. of N/10 hydrochloric acid, 10 cc. of N/10 acetic acid and 10 cc. of N/10 boric acid each require 10 cc. of N/10 sodium hydroxide for neutralization. In other words titration shows that all three contain the same *quantity* of acid. It is well known, however, that hydrochloric acid is a much stronger acid than acetic or boric acids. This means that the *intensity* of acidity is greater.

To give a homely illustration, we use acetic acid in the form of vinegar as a seasoning, and boric acid as an eye wash, but we would not think of using hydrochloric acid for such purposes. It is the *intensity* of acidity which is of importance in chemical processes and which is measured by determining the Hydrogen Ion Concentration. Actual measurements show that hydrochloric acid has almost 70 times the active acidity or intensity of acidity of acetic acid, and over 10,000 times the intensity of acidity of boric acid. This is one reason why titration gives erroneous results. Similarly sodium hydroxide is almost 100 times as intensely alkaline as ammonium hydroxide altho titration would show the quantity of alkalinity to be the same.

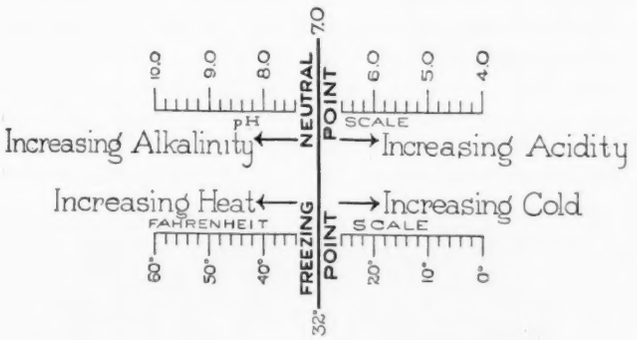
If in chemical processes we were working only with known pure acids and alkalis, the intensity of acidity could be calculated from the titration values. In the plant, however, practically every material added or used in a process, whether it is an acid, alkali or salt, including organic compounds, usually contains some impurities in rather indefinite amounts, and these, as well as the basic materials themselves which may also vary considerably, may have a marked effect on the acidity or alkalinity of the mixture. In some cases they may change the intensity without changing the quantity of acid, and in others they may change the

quantity of acid without changing the intensity. Since, as stated above, it is the intensity of acidity which is of importance, it will be seen why titration cannot be relied upon.

Test papers such as litmus, congo red, etc. which change color in the presence of acids or alkalis, do give a rough measure of the intensity of acidity and in this respect are more reliable than titration. The results obtained by use of test papers are, however, usually too inaccurate to be used for chemical control work in the modern plant. This is due to a number of factors:

1. The color changes are not distinct.
2. Different batches of test papers do not give the same reaction.
3. The worker has no standards by which to judge the colors obtained with test papers, that is, a shade which might be considered as indicating slightly acid by one worker might be said to be strongly acid by another and vice versa. By Hydrogen Ion measurements accurate results are obtained which can be recorded in actual figures and which can be duplicated at any time by the same or different workers.

The scale which is used in expressing acidity and alkalinity by Hydrogen Ion measurements can best be explained by comparison with the Fahrenheit thermometer. On the Fahrenheit scale 32° represents



the freezing point of water. Any values higher than 32°, such as 34°, 38°, 46°, etc., denote an increase in intensity of heat, the intensity *increasing* as the numbers *increase*. Any values lower than 32°, such as 30°, 26°, 20°, etc., denote an increase in the intensity of coldness, the intensity *increasing* as the numbers *decrease*.

In a similar manner the intensity of acidity and alkalinity is expressed by the Hydrogen Ion or pH scale. Instead of being called degrees, units on this scale are known as pH values.

If a solution has a pH value of 7.0 it is neutral, i. e. neither acid nor alkaline. Values higher than 7.0, such as 7.4, 8.0, 8.6, etc., denote alkalinity, the intensity of alkalinity *increasing* as the numbers *increase*. Values lower than 7.0, such as 6.6, 5.0, 4.0, etc., denote acidity, the degree of acidity *increasing* as the numbers *decrease*. This is all a plant worker need know about the pH scale in order to use it accurately and intelligently.

It is well known that when acids or alkalis are dissolved in water they ionize, that is they break up to give positively charged H ions and negatively charged OH ions respectively. This is shown by the equations below:

$$\text{(Hydrochloric Acid) } HCl \rightarrow \overset{+}{H} + \overset{-}{Cl}$$

$$\text{(Caustic Soda) } NaOH \rightarrow \overset{+}{Na} + \overset{-}{OH}$$

It is also well known that the intensity of acidity or alkalinity is due to the number of H and OH ions respectively in a given solution.

Hydrochloric and sulfuric acids are strong acids because in solution they give a large number of H ions. Acetic and boric acids are weak acids because they give comparatively few H ions in solution. In a similar manner sodium bicarbonate is a weak alkali because it gives relatively few OH ions in solution. Sodium carbonate and sodium hydroxide, on the other hand, are strong alkalis because they give a large number of OH ions in solution.

The determination of the pH—that is degree of acidity or alkalinity—of a solution by the color measure method depends on the fact that various indicators change in color when they are added to solutions having varying degrees of acidity and alkalinity. In order to obtain sharp color changes a number of indicators are required to cover the present workable scale pH 1.2-13.6. These indicators, with their pH ranges and color changes are given in the following table:

Name	pH Range	Color Change
Meta Cresol Purple	1.2-2.8	Red-Yellow
LaMotte Yellow	2.6-4.2	Red-Yellow
Bromphenol Blue	3.0-4.6	Yellow-Blue
Bromcresol Green	4.0-5.6	Yellow-Blue
Chlorphenol Red	5.2-6.8	Yellow-Red
Bromthymol Blue	6.0-7.6	Yellow-Blue
Phenol Red	6.8-8.4	Yellow-Red
Cresol Red	7.2-8.8.	Yellow-Red
Thymol Blue	8.0-9.6	Yellow-Blue
LaMotte Purple	9.6-11.2	Purple-Red
LaMotte Nitro Yellow	10.0-11.6	Colorless-Deep Yellow
LaMotte Sulfo Orange	11.0-12.6	Pale Yellow-Deep Orange
LaMotte Violet	12.0-13.6	Red-Blue

Because the pH range of these testing reagents overlap it is possible by elimination tests to determine accurately the pH value. The color change for Bromthymol Blue is from Yellow at pH 6.0 to a Deep Blue at pH 7.6. Therefore if Bromthymol Blue is added to a Solution, and a color between Yellow and Deep Blue is obtained, the pH of the Solution which is being tested has a pH between 6.0 and 7.6. By comparing the color of this test sample with that of prepared Color Standards for Bromthymol Blue, which are illustrated in Figure 1, the exact pH value can be determined. If a Yellow Color is obtained on adding the Bromthymol Blue Indicator Solution to

the test sample, the Solution is at least as acid as pH 6.0, and possibly more so. The test should, therefore, be repeated, using more acid Indicators, such as Bromcresol Green, etc., until the correct one is found. If on the other hand, a Deep Blue color is obtained on adding Bromthymol Blue to the Solution which is being tested, the pH value is 7.6, or greater. The test should then be repeated, using the more alkaline Indicators, such as Thymol Blue, LaMotte Purple, etc.

The LaMotte Roulette Comparator, which is used in making pH determinations to eliminate the effects of color and turbidity in the sample, is illustrated in Figure 2.

Having discussed the theory of pH control, its application to various processes will be of interest. It is of course impossible to discuss any one subject in detail or to give all possible applications. Enough will be given, however, to illustrate the principle and suggest to the chemical manufacturer how this

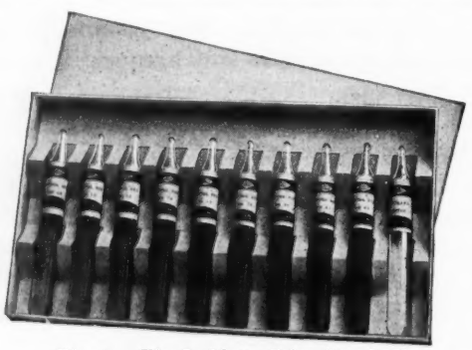


Fig. 1. The LaMotte Color Standard.

modern method of control might be used in his own plant operations.

pH control is a panacea for all industrial ills. Obviously its relative importance will vary in different processes, but in no case can other factors be neglected. The real value of pH control is obtained only when all the important factors are considered simultaneously with the hydrogen ion concentration.

Water Purification

From the standpoint of economy of operation and quality of water produced, coagulation to remove suspended matter, color and bacteria is probably the most important step in the water purification process. Wide experience in many different parts of the country has demonstrated that the most efficient coagulation takes place at a definite pH value, this value being different for different waters. For example, the optimum pH for different waters in one state varies from 4.2 to 7.6 when alum is used as a coagulant. This has been found to be due to variations in color, turbidity, natural alkalinity, and a number of other factors. No definite optimum can therefore be given and it is essential that it be determined for each specific water. pH is just as important if ferrous sulfate or sodium aluminate is used, either in place of or in conjunction with, alum. Accurate pH control results not only in savings in chemicals but also in producing a water of uniformly satisfactory quality.

Corrosion

The role that acids and alkalis play in the corrosion of metals is well known. This is an important factor in the control of boiler feed water, cooling water for condensers, refrigerating brines, etc. Probably the three outstanding factors in corrosion are hydrogen ion concentration, dissolved oxygen and dissolved salts. Shipley and McHaffie have shown that corrosion of iron in the absence of oxygen is proportional to the hydrogen ion concentration until pH 9.4 is reached. The corrosive effect of oxygen is, however, diminished as the pH is increased. This shows the importance of pH control in the chemical treatment of boiler feed water.

In the case of refrigerating brines, the relative corrosion rate on iron and steel decreases with increase in pH, but above pH 12.0 pitting occurs. However, there is practically no pitting at about pH 10.0. With galvanized pipes, ice cans, etc., corrosion increases both above and below 9.5 to 10.0. This range is probably best for galvanized parts but does not sufficiently retard corrosion of iron, so chromate is usually added for this purpose. Chromate apparently has little or no effect on zinc. Ammonium chloride is particularly corrosive to both iron and zinc. As a rule weak brines are generally more corrosive to zinc than strong ones. In all cases it is advisable to keep the oxygen content as low as is practicable, and accurately control the hydrogen ion concentration. The acidity of soils is an important factor in the corrosion of underground piping.

Paper Manufacture

The point in the paper making process at which control of acidity is probably of greatest importance

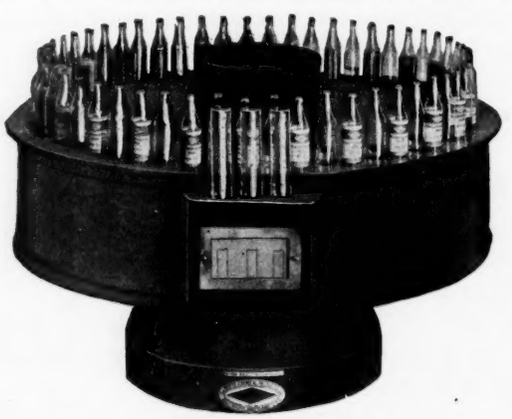
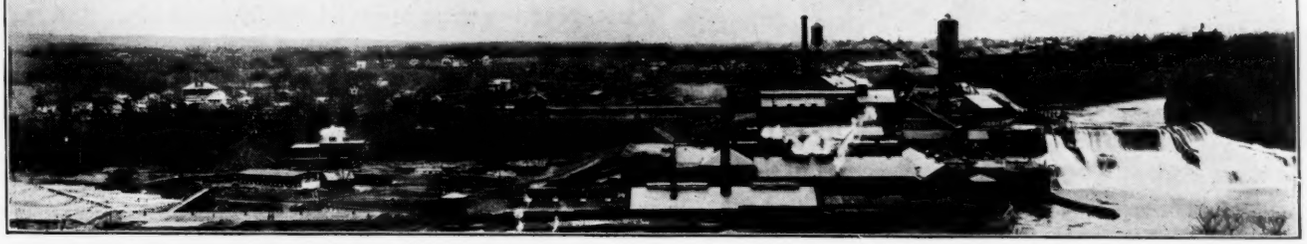


Fig. 2. The LaMotte Roulette Comparator.

is in the precipitation of the sizing. The sizing agent, which is usually rosin soap, prepared from rosin and soda ash, is precipitated by means of alum. If too little alum is used, the size will not be completely and efficiently precipitated. On the other hand, additional alum over that necessary for proper precipitation not only adds to the cost of manufacture but also has

(*Continued on page 224*)

CELLULOSE and CHEMICALS



The Raw Materials of the Paper Industry

Reviewed by

Dr. Hugh P. Baker

PAPER in all of its varied forms is a commodity of such common and wide spread use that the meaning of paper from the manufacturing standpoint is seldom if ever appreciated by the consumer. It is not easy in fact to define paper in such a way as to indicate the raw materials which go into its make-up or the method of manufacture. An old English book upon the subject of paper manufacturing gives a simple definition which is as applicable to-day as when the book was written nearly a century ago. This definition is that "paper is an aqueous deposit of vegetable fiber." This definition indicates that the principal raw material in the manufacture of paper is vegetable fibre and also emphasizes the part which water plays in the laying of the fibres into a sheet. It does not, however, indicate what kind of vegetable fibres are used or what other raw materials enter into making the sheet of paper of value for the use desired.

Paper is used in this country in such great quantities that it has become one of the most ordinary things of life and, therefore, it is accepted as a continuous necessity with little or no thought of the raw materials, the labor, the money and the brains which are being used to produce it. An announcement by one of the leading New York dailies several weeks ago that it had used a thousand tons of newsprint paper in the printing of a single Sunday edition is an interesting example of the part which paper is playing in the daily lives of the people. From the home to the office and to the great industrial plant paper is being used in ever increasing quantities. Last year the per capita consumption of newsprint paper was 58 pounds, of book paper 23 pounds, of wrapping paper 23 pounds, of paper board more than 60 pounds,

Airplane view of Three Rivers, Quebec, Mill of Canadian International Paper Company. This mill is located at the confluence of the St. Lawrence and St. Maurice Rivers, eighty miles below the City of Montreal, and is the largest paper mill in the world. It has a capacity of 700 tons of newsprint paper a day.

and altogether there was a total per capita consumption of over 200 pounds of paper. This is more than twice the per capita consumption of paper in any other nation.

One very interesting development in the use of paper in this country during the past half century has been an almost complete change in the purposes for which paper is used. Up until the beginning of the present century paper on a tonnage basis was used most largely for printing and correspondence. To-day from the standpoint of quantity used printing and correspondence are secondary to the use of paper for wrapping, for shipment of commodities, for construction and as material entering into the manufacture of other commodities.

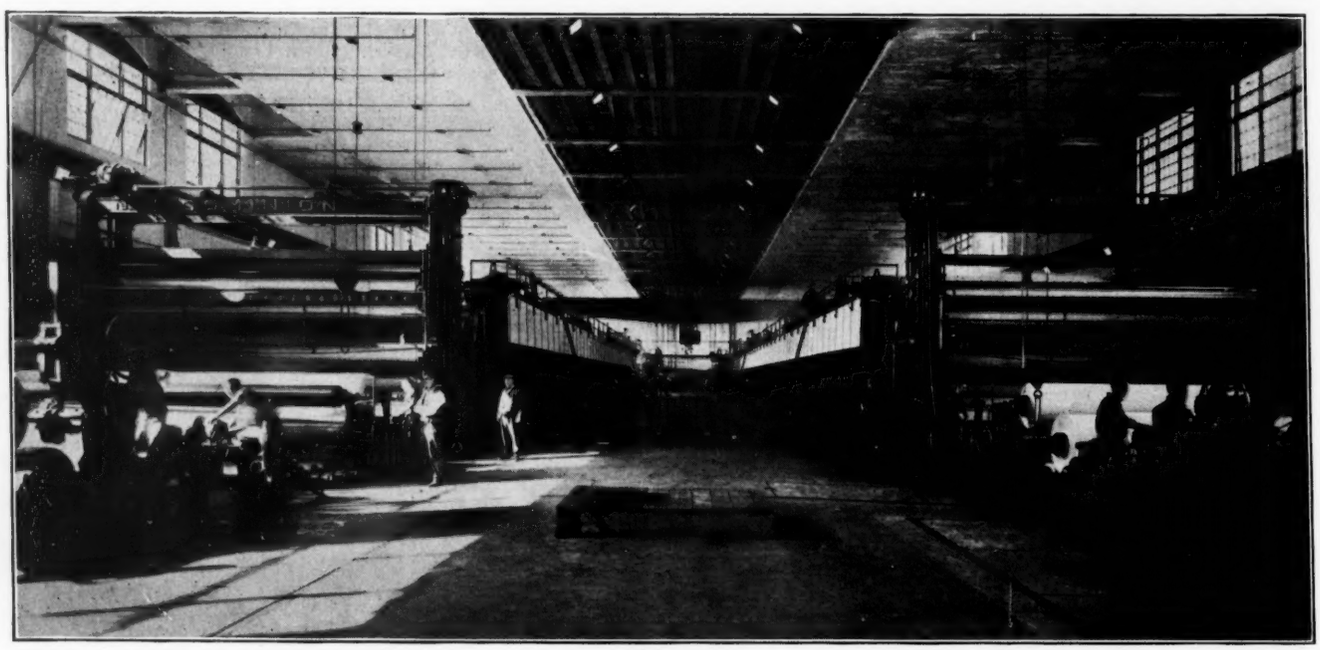
From the time of the first paper mill operated in this country, which was developed for the manufacture of handmade paper in 1690, at Germantown, just outside of Philadelphia, down to the beginning of the period of rapid industrial development following the Civil War, cotton and linen rags were the principal primary raw materials for the manufacture of paper. From the first crude beginnings in the use of pulp made from wood in the late '60's the amount of wood used for the manufacture of paper in proportion to the amount of rags used has increased very rapidly. To-day wood pulp forms more than 60% of the primary raw material for paper, with rags making up but 4% of the raw material. Waste paper stock and manila stock make up the remaining 36%.

Secondary raw materials play an exceedingly important part in the manufacture of paper of various grades. The paper industry, for instance, is the largest consumer of rosin in this country using last year something over 100,000,000 pounds. So, too, the paper industry is the largest consumer of casein, using last year approximately 34,000,000 pounds. Sulfur, China clay, alum, chlorine, and various dyes are used in very large quantities in the manufacture of pulp and paper.

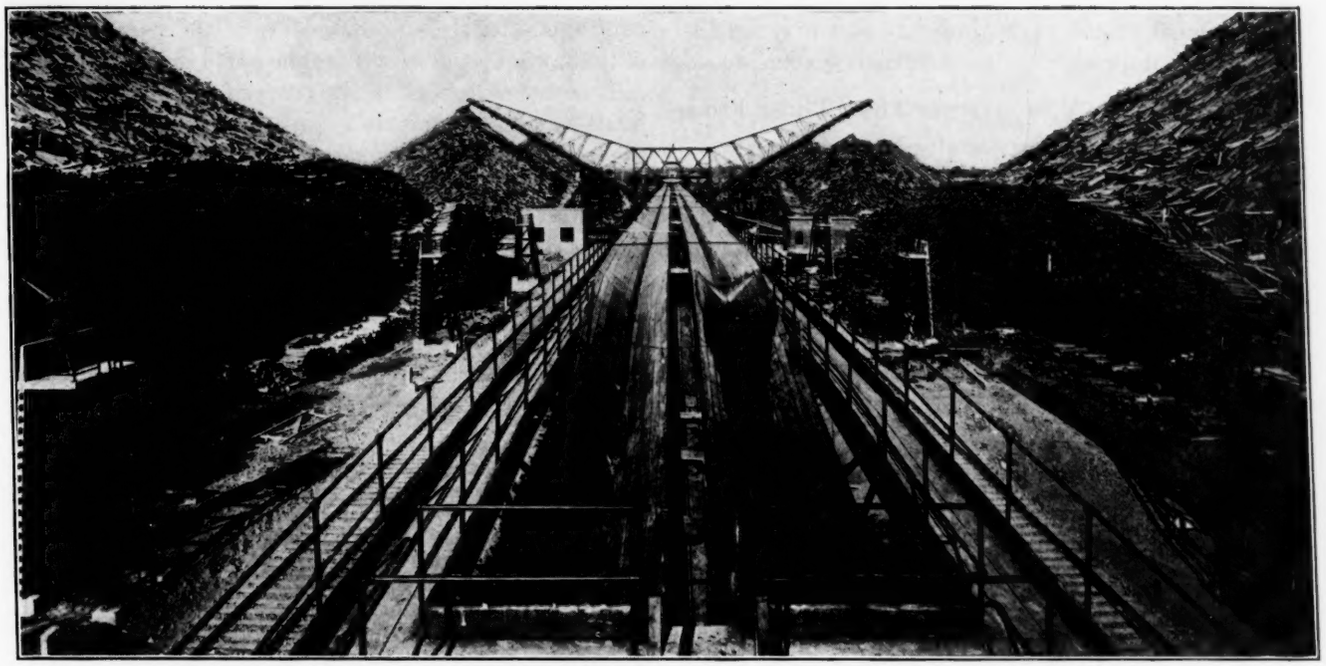
It is fortunate for the paper industry that a large part of its primary raw material comes from a replaceable natural resource—the forest. In taking wood from the forest and turning it into paper there is involved the application of a number of different sciences; engineering, chemistry, biology, forestry, physics, etc. This means that the industry is one of evolution and action, as well as one involving a high degree of craftmanship and art.

A Change in Basic Raw Materials Within a Human Generation

The paper industry is the only great industry of the country which, though an active industry since the Revolutionary War, has changed its primary raw material in large part within a human generation. As indicated above, up until the time of the Civil War all paper made in this country was produced from cotton and linen rags. In the late '60's certain processes for the reduction of wood to pulp were brought into this country from Europe and it was soon found that wood could be used for the manufacture of a paper that was entirely satisfactory for printing. With the knowledge that paper could be made chiefly from wood, and with the thought that there were almost inexhaustible supplies of wood, there followed



Interior of a paper machine room at the Gatineau Mill of Canadian International Paper Company, showing two of the four paper machines at the mill. These machines are the largest paper machines in operation in the world to-day, and have an aggregate capacity of 600 tons of newsprint paper a day. Each machine will produce a sheet of paper over twenty-one feet wide and is designed to run at the rate of twenty feet a second. The mill is located in the Province of Quebec on the Ottawa River, five miles below the cities of Hull, Quebec, and Ottawa, Ontario, and two miles below the confluence of the Gatineau and Ottawa Rivers.



The woodpiles at the Gatineau, Quebec, Mill of Canadian International Paper Company, showing a double stacker in operation. These double stackers are the only ones in use anywhere at the present time.

logically the idea of the cheap newspaper and the cheap book. In may be said that the great printing presses, now turning out newspapers in editions running into the hundreds of thousands, and books seemingly unlimited in number, were developed as the result of the introduction of wood for the manufacture of paper.

The first pulp produced from wood was crude and poor as compared with the product of modern mills and it was a question for some time as to whether wood pulp could be used for the making of the better grades of paper. Gradually, however, investigation and research brought about the refinement of wood pulp and to-day this refinement has been carried to the point where cellulose from wood is in very direct competition with cotton and wool.

While more than 90% of the 10,000,000 odd tons of paper produced in this country annually is made from wood, nevertheless cotton and linen rags will continue to be used in large quantities for the production of the higher grades of paper where special characteristics, such as permanency and durability, are required.

The processes by which wood is reduced to pulp are exceedingly interesting. The softwoods, such as spruce, balsam fir, hemlock, and certain southern and western soft woods, furnish the best grades of pulp. The reason for this is that the softwoods have a longer fibre, they are very readily reduced to pulp, and give us a pulp of greater strength than that produced from hardwoods. To-day five different processes are being used for the reduction of wood to pulp. Two of these are mechanical and three are chemical. The most common mechanical method is that by which groundwood is produced. In this method a stick of wood is pressed against a revolving grindstone which is constantly flooded with water and the pulp is produced by abrasive action. This groundwood or mechanical pulp is relatively low in cost and while not particularly strong it can be used very satisfactorily in mixtures with smaller amounts of chemical pulps in the manufacture of such papers as newsprint, the cheaper grades of book paper and paperboard. The second mechanical method is one that has been developed recently by the application of the explosive principle in the reduction of wood to pulp. This process, while in its infancy, is now being commercially applied.

The chemical methods for the reduction of wood to pulp can best be described by the names of the grade produced by the different processes. These are, sulphite, sulphate and soda pulp. The pulps produced by these methods give us the strongest and most satisfactory pulps for the higher grades of paper. The soda pulp process is most commonly used for the reduction to pulp of the hardwoods, such as the cottonwoods, tulip, poplar, birch, maple, etc. After reduction of wood to pulp the fibres are bleached, beaten and colors added previous to the stock being run onto the paper machine.

The very fact that wood has come into use in the industry only within the present generation indicates in a way the youthfulness of the industry and the future possibilities of development in the way of continued refinement of pulp for the manufacture of commodities that come into direct competition with commodities manufactured from cotton and wool. As refinement is carried forward to the point where nearly pure cellulose is produced, the result is a substance that is practically of the same character as the cellulose produced from the cotton plant. This refinement of woodpulp has made possible the rapid

development of the rayon industry and may lead to the practical production of artificial woolen goods.

Use of Vegetable Fibres Other Than Those From Wood and Cotton for the Manufacture of Paper

Discussion of the primary raw materials used in the manufacture of pulp and paper would be incomplete without reference to what are known in the industry as substitutes for wood, such as straw, corn stalks, various grasses, etc. While paper can be made from almost any vegetable fibre, and while considerable quantities are being made from straw to-day, it is not at all probable that wood will ever be replaced by these so-called substitutes as the principal raw material for the industry.

Factors which seem to stand in the way of the practical use of substitutes are expense of collection in sufficient quantities to keep a modern pulp mill operating 24 hours a day for 300 days a year, low yield of fibre and poor character of the fibre after the pulp has been produced. The use of these substitutes is after all an economic question. A real scarcity of wood in any given region might well bring about conditions that would justify the use of these substitutes. However, as will be indicated in discussion following as to the conservation of raw materials for the industry, there seems little likelihood that any of the plants producing fibre for the paper industry other than the woody plants and cotton and flax will ever be used in any very large way in this country.

Remanufacture of Paper

In referring to the relative quantities of the various raw materials entering into the manufacture of pulp and paper reference was made to the fact that waste paper or paper stock makes up a considerable proportion of materials other than wood and rags used for the production of paper. In 1926 more than 30% of the primary raw materials used in the industry was waste paper. While a certain amount of waste paper has always been used with the so-called "broke" in the mill going back into the beaters, it is only since the production of paper or fibre board on a large scale was begun that paper stock has been used in large quantities. A careful estimate indicates that approximately 4,000,000 tons of paper stock, valued at more than $60,000,000, was used last year in the manufacture of paper or fibre board of all grades. As with the use of other raw materials, the use of paper stock is entirely an economic matter and it is safe, therefore, to assume that as the cost of various grades of pulp increases the amount of paper stock used will increase. In fact the possibilities in the remanufacture of papers are not at all exhausted.

Forestry Fundamental to Permanency

The practice of forestry, the management of forest lands and forests in such a way as to produce the maximum amount of the right kind of wood on a continuous basis, is fundamental to the permanency of the raw material supply for the paper industry.

Forestry as applied to the proper handling of woodlands has no mystery in it but rather it is simple in application. Trees are a crop from the soil and the application of forestry means the protection of the trees and the forest in such a way that the land producing these trees may produce more and better trees on a basis that will insure continuity of product and a product of the greatest possible value for the use to which it is to be put.

The question is often asked as to why forestry is not practised more generally in this country to-day.

Virgin Forest of red spruce and hemlock, Adirondack Mountains, New York. (Courtesy U. S. Forest Service.)

The answer in a way is a simple one and that is that through the years wood has been too cheap to justify the expense of protection and proper management. As long as there were extensive virgin forests where wood could be gotten practically for the cost of cutting and where that cost was below the cost of producing new crops there was no particular incentive to make forest land continuously productive. With the cost of wood, generally speaking, rising steadily the time has now come, at least in the Eastern half of the Continent, when the cost of wood has passed the cost of production. Therefore when such deterrent factors as forest fires and wrong methods of taxing the forest can be overcome, wood will be grown, as other crops from the soil are produced, on a practical business basis.

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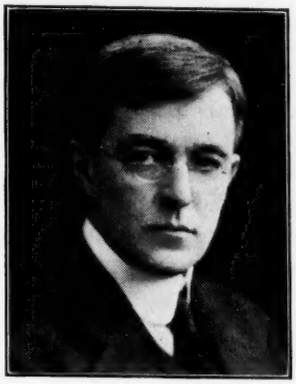
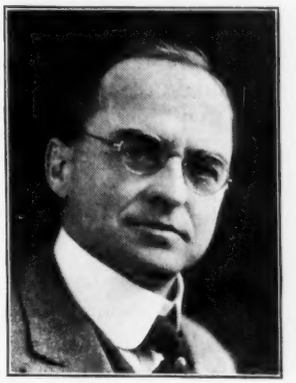
LANGMUIR—
Perkin Medalist



Dr. Irving Langmuir

Extolling Dr. Irving Langmuir, this year's recipient of the Perkin Medal, as the man who made possible a fifty per cent. saving in all electric power bought, Dr. W. R. Whitney of the General Electric Company relates the story of Langmuir's accomplishments on the occasion of the presentation of the medal at the Chemists' Club, New York, on January thirteenth.



Dr. W. R. Whitney

I CANNOT expect to do justice to the subject of Dr. Langmuir's accomplishments. Even as I try, conventional sentences seem unsatisfactory, for the truth, if properly told, would animate and stimulate young men. Let me put the matter in my way, while you use your own units of measure. I know his interest in young men and his unbounded faith in science. These are so great that I want my brief address to help students of physics and chemistry to see the pleasure and excitement of research without special reference to the financial rewards and honors which exist for first-class scientific work.

Above everything I place his published scientific work, because it is the kind on which he and others will continue to build serviceable structures, and we know that such mental and spiritual advances as it marks are superior to technical ones. His published researches on fundamental physical and chemical subjects comprise one hundred and twelve papers, all on new knowledge. They cover such widely different fields as chemical reactions at low pressures, conduction, conviction and radiation of heat, vapor pressures of metals, new vacuum pumps and vacuum gauges, crystal structure, atomic structure, electronic and ionic currents, high power vacuum tubes, theories of absorption, of evaporation, of passivity, etc. They are all subjects for which he has combined rare insight with unusual practical experience.

Second to his published scientific work I place that equally unmeasurable thing which, not only in a research laboratory but in all organizations of men, determines results. This is his willingness and ability to work with, assist, guide or direct others. These seem less tangible but more valuable than the material accomplishments which I shall consider next.

Langmuir has accomplished great things in the electrical industry. The average citizen might cry out here, "Don't say it with flowers—tell us in dollars." Perhaps, after expressing it in millions of something or other, I can then peacefully proceed to a finer appreciation. Dr. Langmuir was the first to apply argon and nitrogen to tungsten lamps, and thus reduced by 50 per cent. the cost of more than half the light we all buy. The total number of tungsten lamps sold in America last year, vacuum, gas-filled and miniature, was 538 millions. Nearly a third of the lamps now sold are gas-filled. There have been made in the United States nearly a thousand million of these new type lamps. More than 100 million of them are made annually.

Million Dollar Saving Daily

One way to express the value of this improvement of putting gases into the tungsten lamp is to say that it saves the American public more than a million dollars a night on its lighting bill of over a billion dollars a year.

But Langmuir also carried out successful work on the vacuum lamp, and this, too, might be expressed in millions. He would wish me to say, however, that the discoveries of others, quite necessary at the time for first-class lamps, were conjoined in the finished products. The same may be said of radio tubes. While these came into use through the consecutive efforts of Edison, Fleming and de Forest, Langmuir's work seems to have been absolutely essential to the production of radiotrons, and these, too, are now used by the million.

His long study of atomic hydrogen, referred to later, led him to the atomic hydrogen flame, which now welds the evaporators of all our refrigerators. This is a development not yet expressible in millions,

but it may be, and if this kind of welding should replace riveting in buildings we could at least speak of millions of rivets which will be quietly omitted.

Dr. Langmuir has already received medals for some of his accomplishments, and listened to corresponding addresses of appreciation, so I may be brief and embarass him less by recalling that he twice received the Nichols Medal, once for work on chemical reactions at low pressures and again for work on atomic structure. The Hughes Medal came to him for researches on molecular physics, and the Rumford Medal for thermionic researches and for the gas-filled lamp.

I shall not attempt a systematic outline of the sixteen years of Langmuir's inquisitive experimental study which I have witnessed. Scores of his researches continue to weave together into a fabric of ever-increasing value and interest. I can but picture a few things as I see them, and let you imagine how his methods of thought and action are applied in other cases.

Work On The Atom

To him the atom had long been a really existent thing, just as the boldest chemists pictured it, but he did not hesitate to dissect it and construct it anew in much finer detail. He weighed the advanced theories of matter and pushed hard with the foremost speculators, for he was actively interested in principles of elementary physics and chemistry. In 1916 he wrote a long article which described only the beginning of extensive researches on the constitution and fundamental properties of solids and liquids. He had been incited by the Bragg work on crystal structure. This work led him to other studies and to such other publications as "The Absorption of Gases on Plane Surfaces," "The Shape of Group Molecules," "The Surfaces of Liquids," "The Interior Structure of Atoms and Molecules," "The Octet Theory of Valence, Isomorphism, Isosterism and Covalence," etc. None of these are particularly edible without cooking, but his experimental work made them palatable. It is characteristic of him to advance a new hypothesis, but still more characteristic to prove it by exhaustive experiment.

Before Dr. Langmuir joined our research staff everyone, from Edison down, had sought to improve the vacuum of the incandescent lamp. Will it stay better if initially made better, or does glass leak, even a little ? Is the glass some sort of sponge which slowly gives off absorbed gases ? Is it perhaps like some dyhrated mineral, such as mica or basalt, slowly yielding water of composition to the vacuum ? To what extent does the carbon or the metal filament carry within itself gases which later cause deterioration ? What are the possible diseases of a lamp and how lengthen its expectation of life ? Langmuir not only asked these questions and others, but he even seemed to see in the lamps the kinds of gases and their individual atoms. In his bold and speculative mind he saw molecules all arranged in proper places and oriented even to single atomic layers. Carbon monoxide and dioxide, water, air, etc., were present in glass because it had once been liquid and in equilibrium with all the gases of the glass furnace.

The Analytical Mind

Such foresight, on the strength of pure knowledge and reasoning, is free to anyone, but some are more successful with it than others. The successful are those who have profound knowledge of their field and who carry on intelligent and extensive experiments. But there is admittedly in Langmuir something more. It is a very unusual analytical mind. In his vacuum study he exhausted empty lamp bulbs and bulbs containing filaments, at all possible temperatures. He operated lamps for days under liquid air, and he included a scheme for exhausting lamp bulbs, heated close to their melting point, which had vacuum both inside and outside, because otherwise the external pressure flattened them completely. He and his co-workers spent many years doing such work. They also revised the experiments and turned them upside down and inside out. Extensive experiments were made in which the merest traces of various gases were put into the most perfectly evacuated bulbs, and their reactions, absorptions and distributions studied.

This work has really never stopped. The original complicated exhausting apparatus, with its numerous bulbs of gases, special vacuum pumps, gauges and various devices, all securely welded together in one continuous glass system, has been in use by him or his assistants every day for the past fifteen years and is probably destined to contribute still further to atomic and electronic physics. So it is his persistent investigative method, its continuity and coherence that I like to think about. His discovery of the atomic welding arc of last year is a product of cultivated growth and illustrates this patient, persistent process.

The Hydrogen Welding Torch

The atomic hydrogen welding torch is a combination of a jet of hydrogen gas through which an electric current is being sent. The electrical energy dissociates the hydrogen molecules into atoms. These not only exert great chemical reducing power, but, by their inter-reaction, give a localized, extreme heat suited for reducing and welding most of our refractory metals. The device, so simple in appearance, did not result from carelessly throwing together in some single, snappy experiment the various parts which now constitute it. New knowledge which seemed at first useless, remote, and merely mathematically pure, was being collected for fifteen years before this welding arc was conceived. The published series of relevant data tells the story. Years ago Langmuir showed that thermal losses from tungsten filaments in hydrogen at high temperatures deviated from the law for gases in general, even including hydrogen at

low temperatures. Thermal losses were usually proportional to the 1.9th power of the absolute temperature. In case of hydrogen, however, the losses were much greater and the deviation increased rapidly with temperature.

Here was a new fact, or a discovery. He saw in it the separation of the atoms of hydrogen, and so sought a determination of the energy involved. He found this to be 98,000 Cal., which is more than that for the combination of hydrogen and oxygen. This meant to him that unusually high temperature should result from the reunion of the hydrogen atoms, and he found he could even melt tungsten thereby. While carrying out this study, with other researches under way, he published articles on the dissociation of hydrogen in 1911, 1912, 1914 and 1915. Still more came out in 1916, and hydrogen continued so to interest him that the process called atomic hydrogen arc welding only became complete and was described in 1926. Thus, this is a natural outcome of a long series of researches. His production is not sporadic, sudden and accidental, but has an almost predictable certainty about it.

The same continuity of events appears not only in his technical successes, but in other lines of his published work. For example, his treatment of thermionics, in one form or another, is sprinkled through our chemical and physical literature from 1915 to date, and radio tubes are still being improved by it. A similar growth of knowledge of mercury arc characteristics is shown in his writings, as well as such speculative concepts as the Lewis-Langmuir octet theory of atoms. While these purely scientific researches were under way he found time to develop one of the most efficient vacuum pumps known. This was described under the title, "A High Vacuum Mercury Pump of Extreme Speed," and these pumps were at once put into the factories to meet the severe requirements of radio and X-ray tube production.

Publishes Results of Findings

I like to think of the medalist as an example of what a good scientific education may do when it has first-class raw material to work upon. Langmuir's is not a case of weak exposure to some mental contagion which clung to him, but a case of virile acquisition and constructive use of a stock of modern science which he has always kept increasing. It is only in recent years that scientists or engineers working in industry have been both technically productive and also active in publishing new scientific data. Langmuir has done much to encourage others in this way. He has averaged seven publications each year for sixteen years. I have been interested to note the persistence with which he has continued along each of his chosen paths of research. In his frequent publications he discloses the daily accretions to his knowledge, and he never loses interest in a subject, for knowledge of it is never complete.

As I said at first, I do not aim to repeat or record all of Dr. Langmuir's work, but rather to indicate by selections the kind of researcher he is and illustrate the fact that his is a great game and one that more men might enjoy. He is endowed with such an unusual analytical and sharp focussing mind that it would be foolish to say that any one could have done his work who was merely persistent, thoughtful, optimistic and energetic. I don't know how analytical minds become endowed; but I know that good education at least helps. Many young men lose inquisitiveness and acquire a fear-complex or some satisfying polarization before they reach the happy level of sustained and exciting flight. My sixteen years of observation of Langmuir convince me that an analysical mind, supported by optimistic, single-minded devotion to nature's old crossword puzzles and novelties, accounts for much of his success, and that perhaps none of these necessary attributes need be exclusively his. I don't like the word "superman" in this connection, and as he is a fearless speculator, he is not super-sensitive. The word "supersensible" seems to fit the occasion. .

When we come to radio tubes, Langmuir's apparent natural fertility is most marked. To recite even the titles of his publications would be exhausting. From the very first experiment, where he was studying the emission of negative current from the old-time carbon filaments and trying to check up the Richardson equation, down to the new radio tubes of to-day, he seemed to have a clear review of the phenomena. When he first talked of pure thermionic emission no one believed in it. All measured results had consisted of mixed gasion and electronic conductions. I personally doubt if the laws of electron emission would have been proved for years but for his work on the tungsten filament.

Increases Radio Tube Efficiency

Starting from the first proof of discharges in vacua as determined strictly by filament temperature (which was the basis of his first radio tubes), he proceeded to find out quantitatively how traces of gases affected the currents. He had developed the now well-known conception of space charge in case of the electrons, and then was able to understand better the ionic conduction which has also found application in so-called "gas" tubes. His work on the electron emission of thoria and other elements as components of tungsten filaments led to enormous increases in efficiency of radio tubes. I will relieve you by not analyzing the extensive group of tubes which came from this work, but I must list here the kenotron, the pliotron, the magnetron, the axiotron, the thyratron, the dynatron, the pliodynatron, which he and his coworkers developed for places in the growing radiotron family.

When Langmuir first told me he thought he could make a better tungsten lamp by putting gases into it than by trying to further exhaust it, I thought he was dreaming. And so he was. But it was the kind of dream he could make come true. Nothing had

seemed more improbable a few months earlier. Through his study of conduction and convection of heat by gases, combined with the laws of radiation of energy from hot filaments, he decided that a filament could be made large as a light-giver and relatively small as a heat-loser. He had already determined the beneficial effect of gases in reducing the rate of evaporation of tungsten at high temperatures, and so, by coiling the fine tungsten wire into a helix, so that its entire surface gave light, while the heat losses were only those of the short cylinder defined by the wire, he was enabled to make the reduction in the cost of light previously mentioned.

There is something in Langmuir's work that suggests, by sharp contrast, an Oriental crystal gazer idly seated before a transparent globe and trying to read the future without doing anything about it—a hopeless philosophy. In my picture an equally transparent and more vacuous globe takes the place of the conventional crystal sphere. It is a lamp bulb, a real light source. Langmuir boldly takes it in his hand, not as some apathetic or ascetic Yogi, but more like a healthy boy analyzing a new toy, even as Langmuir himself studied and fixed the complex watch of his boyhood days, but seeing visions, too, of many new things. There might have been nothing in that vacuum, but he was driven by insatiable curiosity to investigate and learn for himself.

Results of His Dreams

Thus he peopled that empty space with new and strange little beings or personalities which he had first dreamed of, then devised, and finally endowed with real character—and all this solely to make his various dreams come true. He first dreamed that tungsten atoms were being carried by disreputable foreign atoms (oxygens) from the filament to the glass to obstruct the light. These were parts of disobedient water molecules which had not come out when commanded. They were divorced by the filament and were boot-legging tungsten in the one place in the world where a dry law was absolutely necessary. He dreamed of banishing or imprisoning these bootleggers. When Langmuir made this dream come true we got good, clear, long-lived tungsten lamps.

Still he dreamed with both eyes on the ball, of a greater light. Therefore, he populated the lamp bulb with new beings, rare gases of dependable character, like nitrogen or argon molecules. His divorced water molecules had taught the danger of affinities, so he chose for this new lamp investion a great horde of argon molecules. These had no affinities and are never divorced because they never marry. By this method the light he foresaw in the bulb became just twice as great as it was before, and all of us now easily see it, and the world is glad to pay for it.

Gazing into the same sphere again, he dreamed about disembodied electricity, and soon the reliable little electrons were tamely obeying special laws—

(Continued on page 241)

Costs and Yields

Crude coal oil may be obtained by the Bergin black coal process in increased yields, according to General-Director Bruckmann in an address before the German World Economics Society. The present amount is 650-700 kg per 1000 kg of coal against 490 kg formerly. There is only about 30 per cent. crude residue. From 490 kg of crude oil, 150 kg of benzine and 200 kg of Dusel oil are obtained. A profit of about 70 marks remain after a net cost of 70 marks per 650 kg of coal oil. An annual production of 2,000,000 tons would mean the erection of a 400-500,000,000 mark plant. The brown coal process at Leuna is even more remunerative because of cheaper hydrogen at this plant.

A new blasting method in use in Germany, utilizes carbon primer cartridges soaked in liquid air, neither of which are dangerous when transported or handled separately. Since the liquid air evaporates rapidly, the blasting must take place within fifteen minutes charging and after forty minutes all danger of explosion is past. The cartridge may then be removed, in case of a fuse missing fire. The savings, as compared with other explosives, are asid to be about 30%, not counting the lower transportation costs.—*Dep't. of Comm. Bulletin, 12-5-27.*

The Prudhomme process for low temperature carbonization of coal costs about 101 francs per ton of lignite and yields 30 litres of gasoline and 500 kgs. of semi coke, or 100 francs if all the coke is sold. The sale of by-products, phenol, sulfur etc., will determine the profits.—*La Revue des Prod. Chim. Sup., Dec. 1927.*

Synthetic menthol production in Germany is seriously affecting the market. The product has both appearance and odor of natural menthol. Prices of the latter have accordingly fallen.—*Wm. T. Dougherty, American Trade Commissioner, Berlin.*

Furfural is to be made in Germany by a new process which almost doubles the yield, 16 lbs. per 100 as against 9 lbs. previously, and reduces the cost of manufacture about 90 per cent.—*N. Y. Times, 1-26-28.*

Milorganite, an organic nitrogen fertilizer made from sewage and trade wastes, can be produced at the rate of 30,000 to 35,000 tons per year and sold for $15.00 per ton.—*Ind. & Eng. Chem., Jan. 1928.*

A new dye, du Pont Naphthanil Scarlet, should reduce the ultimate cost of printing since several manufacturing steps are eliminated in its use.—*Fiber & Fabric, 12-24-27.*

Cellulose Acetate

Stability - Low Acidity
Clarity - Uniformity

"Celanese Brand" Moulding Powder

(*Non-Inflammable*)

Acetic Anhydride (90/95%)

Anhydrous Sodium Acetate

Commercial Sodium Acetate

(*Made in U. S. A.*)

As agents for James Miller Son & Co., Ltd., Glasgow

Cresylic Acid (Pale 97/99%)

Pyridine

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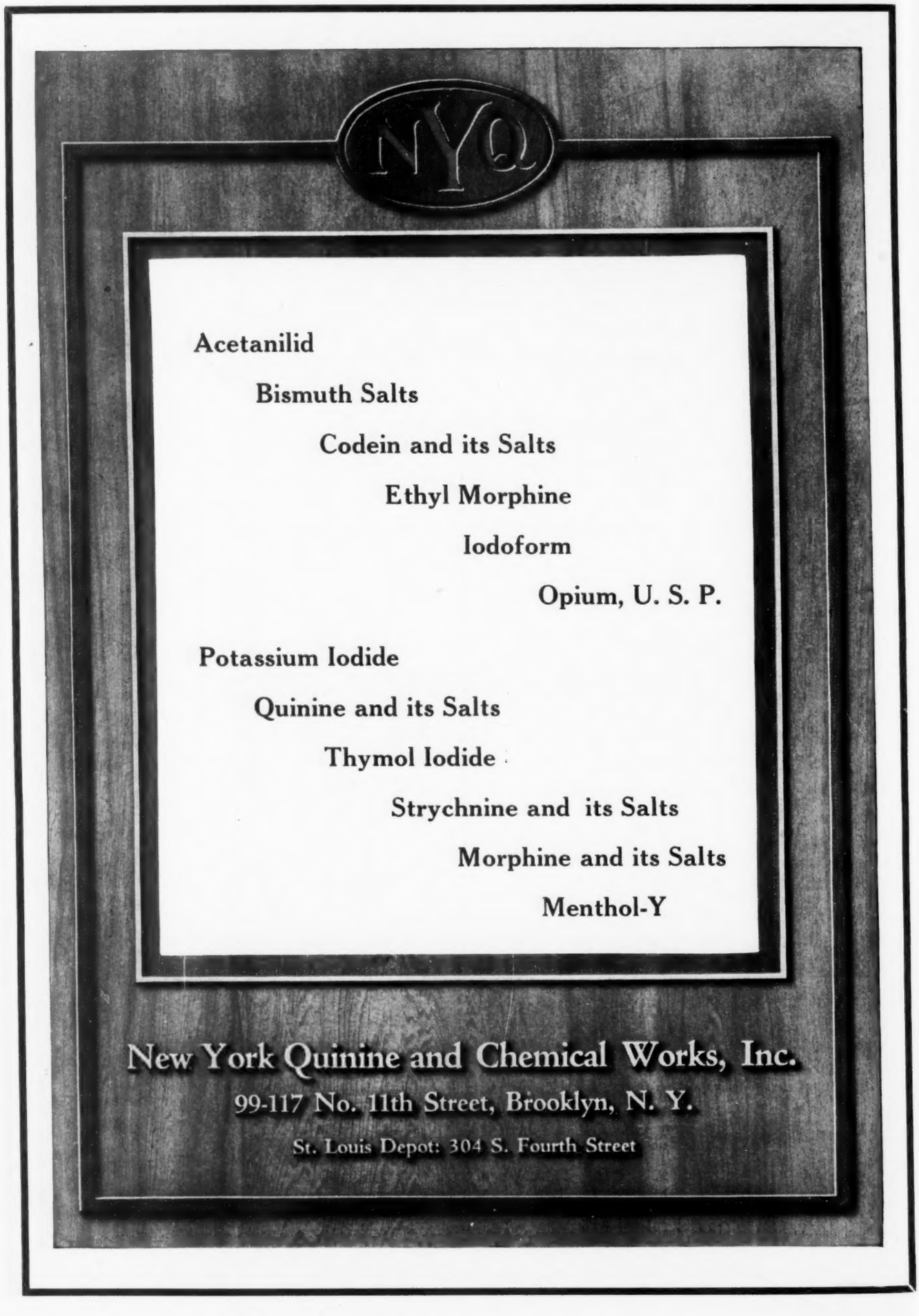
Associated Companies

Chas. Tennant & Co., Ltd.
Glasgow-Belfast-Dublin

Barter Trading Corp., Ltd.
London-Brussels

American - British Chemical Supplies,
INCORPORATED

15 East 26th Street **New York, N. Y.**


NYQ
Acetanilid
Bismuth Salts
Codein and its Salts
Ethyl Morphine
Iodoform
Opium, U. S. P.
Potassium Iodide
Quinine and its Salts
Thymol Iodide
Strychnine and its Salts
Morphine and its Salts
Menthol-Y
New York Quinine and Chemical Works, Inc.
99-117 No. 11th Street, Brooklyn, N. Y.
St. Louis Depot: 304 S. Fourth Street

Chemical Facts and Figures

European Cartel Rumors, Denials, Continue The Center of Attention

Latest Rumors Have It That Germany Plans Purchase of American Interests—Reports I. G. Entering Film Industry—DuPont and Standard Oil Named as Large Holders of I. G. Stock.

Since the first of the year newspapers have continued to be replete with positive assertion and fully as positive denials of cartel formations. Comes an announcement that the I. G. is negotiating for the purchase of American chemical companies and has adopted a policy of penetration into the American chemical business. Combined with Imperial Chemical Industries, Ltd., the German chemical combine is said to be aiming to enter the film manufacturing business, long dominated by Eastman Kodak Co. It is learned that the control of an important company in this field will presently be taken over by an I. G. representative now in this country. The company has already established a subsidiary here to represent its interests in this field under the name of Agfa Raw Film Corp. and it is possible that the new acquisition will be merged with this company. A representative of the I. G. is now in this country for the specific purpose of seeking out directions in which the penetration of that firm in this market may be carried further.

Comes another "reliable report" to the effect that the I. G. is buying Grasselli Chemical Co. which is closely followed by a denial from officials of the latter company which states that to their knowledge the I. G. holds no stock in their company and furthermore has made no effort, so far as they have heard, to secure any.

The I. G.'s plan of campaign is outlined for the skeptical. First, the world is divided into four parts to be called export sales districts. These are Europe, the Far East, South America and North Central America. Each section is put under the jurisdiction of a manager who has practically dictatorial powers in fixing price and sales policies in his district, as well as suggesting directions in which the company may undercut its competitors and get better control of these export markets.

Funds for this large scale expansion program are being raised through the sale of 250,000,000 marks of convertible bonds in the German market. These bonds are being offered to shareholders, and reports from financial houses with German connections indicate that they will be well oversubscribed.

It is further pointed out that there is no way in which foreign investments in American concerns can be prevented and it is known that there is considerable European money invested in American plants. On the other hand, there is much American money invested in foreign establishments, some of it, it is understood, in the very German organization which is seeking a foothold here. Standard Oil of New Jersey is said to hold a large interest in the I. G. and E. I. du Pont de Nemours & Co. to be an important stockholder. It is stated that the taking over of Ansco Products Co., which has now been arranged, will be followed by other acquisitions of the I. G. in this country until its interests are firmly established. A persistent rumor asserts that these interests are buying Sterling Products, Inc. stock on a large scale, thus bringing them in on the United Drug - Sterling Products merger. Dr. Bosch, managing director of the I. G. is quoted as saying that he had tried on a number of occasions to reach an agreement with Allied Chemical & Dye, but without success, while his negotiations with the du Ponts are believed to be going on favorably. Dr. Bosch is said to have suggested joint construction with the du Ponts of large nitrate and methanol plants in this country.

The I. G. is also understood to have contemplated the construction of a huge nitrate plant on its own account. Dr. Bosch has also stated in the German press that he is receiving invitations from chambers of commerce in this country to open factories, and that practically all leading American banks have offered loans.

Still another rumor has it that the I. G. and Imperial Chemical Industries, Ltd., have fallen out over the question of quotas and of participation in British Empire markets and that negotiations with E. I. du Pont de Nemours & Co. have also come to nothing; but that the I. G.'s agreement with Etablissements Kuhlman regarding dyestuffs, has been extended to include fertilizers and other chemicals.

All of this is followed by a subsequent announcement by the I. G. which characterizes as "ridiculous" any reports crediting that company with planning to purchase American chemical plants. The report was declared to be a ridiculous attempt to interfere with the company's contemplated debenture loan issue of 250,000,000 marks at six per cent., which has been approved by stockholders. Furthermore, the I. G. says that even should the British Imperial Chemical Industries co-operate in the reported buying of American chemical plants it would not be possible to raise in Europe the money necessary to carry ou such purchases.

Chemical Advisory Committee Meets

Foreign cartels and German invasion of domestic industry promise to make the second meeting of executives of the chemical industry in Washington, February 16, one of the most significant events of the industry's history. The first meeting, held December 6, 1926, served its purpose in introducing the industry to the Department of Commerce (CHEMICAL MARKETS, Dec. 9, 1926). Previous to this the chemical industry has been rather luke warm in its attitude to the department, being somewhat uncertain as to the latter's attitude, duties and powers. But this year the two meet as old friends to discuss the foreign problem.

Events in the leading chemical centers of Europe will be outlined by Assistant Commercial Attache D. J. Reagan, Paris, and Trade Commissioner Wm. T. Daugherty, Berlin, both of whom have been recalled from their posts abroad to address this meeting. "Foreign Cartels and American Industry" will be discussed by Col. William J. Donovan, assistant to Attorney-General Sargeant, in charge of anti-trust activities of the Department of Justice, who will dwell upon recent developments in Europe connected with the consolidation of foreign chemical industries through international agreement.

A Cressy Morrison, Union Carbide & Carbon Corp., chairman, Chemical Advisory Committee to Department of Commerce, which committee asked Secretary Hoover to call this conference, (CHEMICAL MARKETS, Dec. 15, 1927) will preside. Other speakers will be C. C. Concannon, chief, Chemical Division, on "The Chemical Industry"; Dr. Julius Klein, director, Bureau Foreign and Domestic Commerce, on "The Department of Commerce and the World Economic Situation"; Ray M. Hudson, Assistant Director for Commercial Standards, Bureau of Standards, on "The Significance and Application of Simplification in Industry"; and T. W. Delahanty, Assistant Chief, Chemical Division, on "Opportunities in Export Trade."

An open forum will be held during the meeting at which questions from those present will be answered by Thomas R.

Taylor and Frank M. Surface, assistant directors, Bureau of Foreign and Domestic Commerce; J. W. Furness, chief, Minerals Division; E. G. Holt, chief, Rubber Division; E. T. King, chief, Specialties Division; E. T. Pickard, chief, Textiles Division; N. F. Titus, chief, Transportation and Communications Division; Henry Chalmers, chief, Foreign Tariffs Division; G. J. Jones, chief, Finance and Investment Division; C. J. Junkin, chief, Commercial Laws Division; A. S. Hillyer, chief, Commercial Intelligence Division, and J. F. Hodgson, commercial attache.

General discussions will probably center about advertising collections, credit ratings, distribution surveys, foreign loans, foreign tariffs, packing, synthetic rubber, and synthetic textiles.

The conference will close with a banquet in the evening, on which occasion, Secretary Hoover will be guest of honor and principal speaker.

Cuba Further Restricts Molasses Output

Cuban sugar interests are evidently pleased with the effect of their effort last year to restrict output, for on Jan. 20 President Machado signed another, stricter sugar restriction degree, proposed by the Sugar Commission. The limit of grinding for this season is set at 4,000,000 tons, plus the 250,000 tons carry-over of last year, and a new feature is introduced in the allotment of sugar to the various consuming countries. The United States is allowed 3,000,000 tons; 150,000 tons is held for domestic consumptions, and 600,000 turned over to the recently organized sugar export corporation for export. A reserve of 200,000 is set up.

While molasses is not so specifically provided for, it is pointed out in alcohol circles that this sugar restriction will mean a molasses output of 16,000,000 gallons, capable of producing about 6,500,000 gallons of alcohol. The implication is drawn that molasses prices will not be lower and that with the restriction of raw material alcohol prices will tend to go higher. One of the larger alcohol producers summed up the situation:

"The same effect up the alcohol market, as noted in the past, may reasonably be expected from the new and tighter sugar restriction; but I should look to see the results somewhat intensified in alcohol prices."

Dr. H. S. Taylor, the David B. Jones Research Professor of Chemistry, Princeton University, receives Nichol medal award to be formally presented March 9, at Chemists' Club, New York. At that time, Professor Taylor will speak on "Catalysis as an Inspiration of Fundamental Research." The Nichols Medal is awarded for research which in the opinion of the jury is most original and stimulating to further research. Jury of award comprised Prof. Arthur W. Thomas, Columbia University, chairman; D. H. Killefer, Dr. B. T. Brooks, consulting chemist; Dr. C. E. Davis, chief chemist, National Biscuit Co.; Prof. James Kendall, head of Department of Chemistry, New York University.

German producers of epsom salts have formed a cartel to stablize prices, sell for its members and possibly allocate production. The principal members of the newly formed combine are: Consoliderte Alkaliwerke, Concordia Chemische Farriken, Chemikalien Aktiengesellschaft, Vereinigte Chemische Fabriken and the Kaliwerke Kreugershall. Some concern is felt in Germany as to the effect this move will have on dealers and exporters, but nothing definite has been learned on this point.

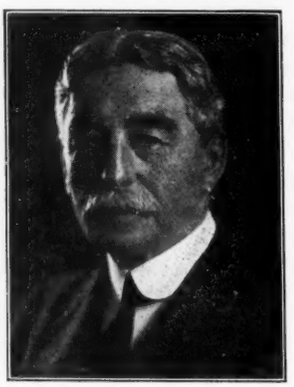
Freeport Texas Co. produces 800,000 tons of sulfur during 1927, according to reported estimates. This compares with total sulfur production for year of approximately 2,300,000 tons and 600,000 tons produced by Freeport during the previous year.

N. Emory Bartlett and Y. F. Hardcastle newly elected vice-presidents, Pennsylvania Salt Manufacturing Co. (CHEMICAL MARKETS, January, 1927), are elected vice-presidents of Michigan Electrochemical Co. and Tacoma Electrochemical Co.

Edward Mallinckrodt Dies

Edward Mallinckrodt, chairman of the board, Mallinckrodt Chemical Works, St. Louis, dies Feb. 1, aged 83. Mr. Mallinckrodt was born in North St. Louis, January 21, 1845. After studying chemistry in Germany, first in a laboratory in Wiesbaden and then at the De Haen Chemical Works, near Hanover, he returned to the United States and, in 1867, with two brothers, organized G. Mallinckrodt & Co. In 1882 the business became Mallinckrodt Chemical Works, with himself as president and general manager. He retained these offices until a few years ago when he retired from active business and was succeeded by O. L. Biebinger. His son Edward, Jr., is vice-president.

Mr. Mallinckrodt also organized and became president of National Ammonia Co. which continued in business until the large consolidation of ammonia firms effected by du Pont interests two years ago.



Edward Mallinckrodt

Mr. Mallinckrodt, one of the wealthiest St. Louisans, had given more than $1,000,000 to scientific education and hospitals. The largest single item was $500,000 to Harvard University for a chemistry building. Among other gifts were one of $166,000 to Washington University Medical School and one of about $250,000 for a radiological division, for the same institution.

Mr. Mallinckrodt was a member of the corporation, Washington University; trustee, St. Louis College of Pharmacy; director, Shaw's Garden; and member of American Pharmaceutical Association, Association for Advancement of Science, American Chemical Society, American Institute of Chemical Engineers, American Society of Chemical Industry, Deutscher Chemiker Verein, and St. Louis Academy of Science.

He was also interested in horticulture and works of art, his collection including works by many of the great masters.

Anti-Trust Law Exemption Sought

Exemption from anti-trust laws of combinations of American firms engaged in importing essential raw materials, is sought in two bills introduced in Congress, Jan. 11, by Senator Wesley L. Jones, Washington, and Representative Walter Newton, Minnesota.

Extension of this exemption to importers of certain materials has been advocated by Herbert Hoover, Secretary of Commerce, since investigation of foreign monopolies of essential raw materials made at the request of Congress three years ago.

Both bills limit the import trade affected thereby to "crude rubber, potash, sisal, or other raw materials or products of nature in a crude or unfinished state which are certified by the Secretary of Commerce to be of a character not made, produced, or grown in substantial quantities within the United States, or to be controlled by any foreign government, combination, or monopoly."

Import combinations to be formed under this authority would be subject to all restrictions placed on export combinations by Webb-Pomerene act and are expressly forbidden to accumulate unreasonable stocks, stifle or lessen competition, or artificially or intentionally increase prices to American consumers under penalty of prosecution by Federal Trade Commission or Department of Justice for violation of anti-trust laws.

Business conducted by H. S. Farleigh at 99 John St., New York, will be continued under name of Merchants Chemical Co. Inc., 21 E. 40 St., New York. Main office of the company is at Chicago, with branches at Milwaukee and Minneapolis.

French Republic Also Defendant In Franco-German Potash Suits

The Republic of France, through Ambassador Claudel files formal appearance January 14, as intervenor in the suit (CHEMICAL MARKETS, April 14, 1927) begun last April by the United States against Franco-German potash interests, and by permission of the Federal Court, granted January 10, the Republic of France now becomes part of the suit for protection of its interests in all the French defendants.

The French defendants, the Ambassador says, "have not done anything in America or entered into any agreement with any one which could be construed as an infraction of the anti-trust laws" of the United States.

The French Ambassador adds that the French defendants were and are now the instrumentalities of Government in which the Republic of France had and has an interest and which the Republic of France employed and employs in the sale of its potash. "This suit was and is, therefore, in effect against the Republic of France," the Ambassador says, pointing out that neither the Republic of France nor these French defendants ever have consented to be sued or proceeded against by judicial process in the court in which the action is pending.

Ambassador Claudel says that neither side in the suit has any desire except to obtain a decision which shall adjudicate these claims "according to the law and the practice of the courts of the United States."

Stanco Inc. Is Formed

Stanco Distributors, makers of Flit, Nujol, Mistol and white mineral oil, is no longer a direct part of Standard Oil Co. of New Jersey, but is now a part of Stanco, Inc. This new corporation is made up of a number of the smaller interests of Standard Oil of N. J. which were not large enough to form a separate company. In addition to Stanco Distributors, Stanco Inc. includes Gilbert & Barker, gasoline and oil pump makers, and various other units.

Officers of Stanco Inc., which is capitalized at $10,000,000, are: F. H. Bedford Jr., president; C. L. Bowman and A. J. Van Wynan, vice-presidents; C. L. Johnson, John Wolke, Evans E. A. Stone, Frank Abrams and A. A. Lacazette, directors.

Executive committee, Bureau of Raw Materials, American Vegetable Oils and Fats Industries, resolves to continue efforts to secure vegetable oil trade commissioners in Marseilles and Rotterdam, and votes to oppose bills prohibiting use of herring for oil, introduced by D. A. Sutherland, Alaskan delegate, and amending the tariff act to permit the President to remove articles from free list to dutiable list, introduced by Representative A. P. Andrews, Massachusetts. Committee also registers opposition to proposal of Southern Ports Foreign Rates Committee to increase freight rates on vegetable oils and oil seeds passing through gulf ports.

At the request of American Bleached Shellac Manufacturers' Association, which is trying to enforce shellac standards adopted several years ago by all large paint and varnish trade associations, the American Fair Trade Association is investigating adulterated shellac which is being sold in large quantities. The Fair Trade Association is bringing suit against producers of sub-standard shellac on the grounds of false advertising.

A new process for producing furfurol, capable of yielding 16 pounds per hundredweight of bran, which compares with nine pounds extracted by the American method, is reported to have been invented by a Berlin chemist, Herr Frank, who has filed claim in the German patent office.

W. H. Coates, treasurer, Imperial Chemical Industries, Ltd., appeals for research in British industry and cites America as reaping the benefits from 600 industrial research laboratories with consequent increase in productivity of about 35 per cent. within a dozen years.

News of the Companies

Anglo-Chilean Consolidated Nitrate Corp. expects extensions of plant to 500,000 ton capacity per year to be completed by March. E. A. Cappelen Smith, president of the company leaves for Chile to supervise completion of plant. Advices from Valparaiso state that government officials and representatives of nitrate industry have been holding meetings at which, it is understood a reduction in export duty on nitrate has been discussed.

Sun Oil Co. decides to enter sulfur producing business by developing its holdings at Boling Dome, Texas. These tracts adjoin those now being worked by Texas Gulf under lease from Gulf Oil Corp. It is said that Texas Gulf attempted lease of sulfur rights on Sun Oil's properties also, but could not agree on price. Prospecting of sulfur is proceeding under direction of Benjamin Andrew's formerly with Freeport Texas Co.

Consumers Import Co., 113 Broad St., New York, has been formed from the food department of Hans Hinricks Chemical Co. Jas. T. Schudtz, manager of the food department, will continue as head and manager of the new concern. Among other products the company will handle agar agar, gum arabic, cream of tartar, cod liver oil and egg products.

Amersil Co., Inc., buys factory of Sidio Co. of America for manufacture of fused silica. O. C. Trautmann, who introduced fused silica manufacture in the United States, is president, and Frederick W. Lovejoy, formerly assistant director of research, General Chemical Co., is treasurer and general manager of the new company.

Wishnick-Tumpeer, Inc., Chicago, purchases controlling interest in Century Chemical Co. and the latter company will be under the direct supervision of Wishnick-Tumpeer, although no direct change is contemplated in the production end of the business.

Bakelite Corp. at hearing before Federal Trade Commission charges infringements of patent and unfair competition by foreign firms importing laminated sheets produced from synthetic phenolic resin and asks Commission to recommend embargo on such goods to protect American manufacturers.

American Solvents & Chemical Corp. announces following appointments; A. P. Jell, vice-president in charge of operations, as treasurer succeeding Lester S. Bacharach, who has resigned; W. F. Evertsen, assistant treasurer, as secretary succeeding Lester S. Bacharach; and R. H. Paine as assistant secretary.

United States Chemical Co., Toronto, secures option on Morrison pyrites property in Gondreau area of Northern Ontario. Mines have been idle since war when production was carried on by Nichols Chemical Co.

Hewitt Brothers Soap Co., Dayton, Ohio, and Chicago, ordered by Federal Trade Commission to discontinue use of word "naphtha" in offering for sale a soap product advertised as naphtha soap but containing kerosene instead of naphtha.

William H. Rorer, Inc., manufacturing chemists, formed in Philadelphia with William H. Rorer, president; Dr. John Ayres, vice-president; Herbert C. Rorer, secretary; and S. R. Miller, treasurer.

Union Carbide and Chemical Co., New York, plans expenditure of $7,000,000 during 1928 on plant construction and extension at South Charleston, W. Va.

International Salt Co., Scranton, appoints N. W. Ayer & Son to handle advertising account.

Personal and Personnel

William du Pont, formerly one of chief owners of E. I. du Pont de Nemours & Co. and from 1879 to 1899 member of the partnership that preceeded its formation, dies Jan. 20, aged 72. He entered the family interests in 1876 and four years later organized the high explosives branch as the Repauno Chemican, of which company he was treasurer until 1884, when he became president. At the same time, he assumed presidency of Hercules Powder Co. and Hecla Powder Co. and in 1889, that of Standard Explosives Co. In 1892, he retired from active business and since then devoted himself to breeding hackney horses and cattle.

Dr. Sidney Haskell, formerly Director of the Massachusetts Experiment Station, and now in charge of the educational work to American farmers for the Synthetic Nitrogen Products, American subsidiary of Stickstoff Syndicate, has gone to Germany for a conference of I. G. fertilizer executives.

James J. Crawford, formerly secretary, William S. Gray & Co., New York, announces his retirement from active business and the opening of an office at 55 W. 42 St., New York, for conducting his personal affairs. These center largely about yachting, the Elks, the Uptown Club and golfing at Southward Ho.

William J. Hale, director, organic research, Dow Chemical Co., and ex-chairman, Division of Chemistry and Chemical Technology, National Research Council, is appointed chairman of a committee of the division to foster co-operative research between industries and academic institutions.

Dr. Karl Merck, Munich, Germany, visits Buffalo Electro-Chemical Co., Inc., which is allied with his other interests, Munich Electro-Chemical Works, Aarau (Switzerland) Electro-Chemical Works, and Hydrox Chemical Co., Illinois.

J. F. Wischhusen, president, Superfos Co. since its foundation in 1920, has become associated with Harshaw, Fuller & Goodwin Co., Cleveland, and joined their New York office.

B. J. Gogarty, formerly connected with J. L. Hopkins & Co. and Chas. Frend Laboratories, has joined the Metropolitan sales force of Rossville Company, Lawrenceburg, Ind.

Kenneth F. Griffiths, Jr., president, Standard Wax Importing Co., K. F. Griffiths & Co., and K. F. Griffiths Buff Co., New York, dies Jan. 22, aged 42.

Dr. C. S. Miner, Miner Labs., Chicago, addresses Montreal section, Society of Chemical Industry, January 18, on "Furfural: The History of an Industrial Research."

C. M. Gambrill, formerly with Mathieson Alkali Works, Inc. Niagara Falls accepts position with Ethyl Gasoline Corp., Yonkers, N. Y.

William D. LeBar is appointed superintendent of Pennyslvania Salt's Wyandotte, Mich., plant, succeeding Y. F. Hardcastle.

O. S. Doolittle, formerly sales-manager, Semet-Solvay Co. is now vice-president, American Fluoride Corp., New York.

L. A. Watt, Monsanto Chemical Works, is elected chairman, St. Louis section, American Chemical Society.

Earl G. Childs, Syracuse, N. Y., is a new director of American Rayon Products Corp.

U. S. Owns Patents Issued To Anyone in Government Employ

The United States is the equitable owner and entitled to the assignment of patent issued to one who, when he made the invention which is the subject thereof, was an employee of U. S. Public Health Service, according to decision rendered by Circuit Court of Appeals in case of Houghton vs. the United States.

As assistant chemist in Public Health Service, Dr. Houghton was appointed member of a board of three to conduct investigations for purpose of developing an improved fumigant combining a warning gas with hydrocyanic gas. Contrary to wishes and instructions of the Public Health Service, he successfully secured patent covering this invention and claimed title to it.

In view of facts of the case, the Court decided that the result of Dr. Houghton's labors belonged to the United States; that title in the invention, and necessarily therefore, in the patent for that invention, equitably belonged to the United States.

Godfrey L. Cabot, Inc., Boston, is constructing a new carbon black plant at Skellyown, Texas, adjoining Roxanna Petroleum Corp.'s absorption gasoline plant, whose waste residue gas the Boston concern has contracted to buy, for conversion into carbon black. Estimated capacity of the new plant will be over 25,000 pounds of carbon black per day to start and will gradually be increased to 60,000 pounds. At present Roxanna is estimated to be "blowing into the air" about 12,000,000 cubic feet of residue gas daily.

Carnegie Institute of Technology is making plans for Second International Conference on Bituminous Coal at Pittsburgh, week of November 19, 1928. Synthetic fertilizers from coal, substitutes for gasoline from coal, power from coal, low and high temperature distillation processes, smokeless fuel, gasification of coal, utilization of coal-tar products, and coal in relation to production of fixed nitrogen, are among the subjects to be discussed at the second conference.

American Fluoride Co., formerly subsidiary to Superfos Co., New York, is now operating independently at 599 Washington St., New York. The company will continue to import, manufacture and sell fluorides, insecticides and chemical specialties. Dr. Julius Jungman is president and O. S. Doolittle, vice-president of the corporation.

Federal Trade Commission is preparing report to Congress regarding action of industries engaged in purchasing cottonseed for crushing, and those engaged in refining and otherwise processing and marketing cottonseed, to ascertain if there be any combination agreement or association in violation of anti-trust laws.

Use of artificial fertilizers by German agriculturists increased 20 per cent. during past fertilizer year, amounting to 717,000 tons of potash, 475,000 tons of phosphoric acid, 400,000 tons of nitrogen fertilizers. Use of carbonic acid chalk fertilizers amounted to 806,000 tons and of burned chalk 591,000 tons.

United States Supreme Court declines to review question whether manufacturers permitted to use denatured alcohol prepared according to a specific formula can insist upon formula being permanently used until permit is revoked. Question raised by Lacquer & Chemical Corp., Brooklyn.

Philadelphia Quartz Co. acquires Frohman Chemical Co., Sandusky, Ohio, manufacturers of silicate of soda. This followed close upon its purchase of silicate plant of Commercial Chemical Co., Chicago.

Chemical Foundation donates $195,000 for study of common cold and announces that Journal of Chemical Education is now under its business management.

The Financial Markets

Du Pont 1927 Earnings Show 10½ Per Cent. More Than 1926

Last Year's Earnings at $15.45 a Share—Now Hold About 23 Per Cent. of General Motors Stock—Duco Sales Show Substantial Increase—Lazote Makes Rapid Strides—Company Disposes of Chilean Properties—Plans Extension of Further Chemical Research.

E. I. du Pont de Nemours & Co. reports net income for year ended Dec. 31, 1927, of $41,113,968.36 after debenture dividends, taxes and all charges, or $15.45 a share on no par common stock outstanding at end of year. This compares with $37,199,164.45 or $13.98 a share in 1926, an increase of 10.5 per cent. Net income after deduction for federal income tax and interest on funded debt and before deduction of $4,833,864 for dividends on debenture stock, was $45,947,832.36, which compares with $41,969,574 in 1926, and is equal to 9.5 times debenture dividend requirements for the year.

The company's income from operations was $16,577,695 last year, including the equity in earnings of directly controlled companies, and $30,565,002 from investments. This compares with $14,803,725 income from operations in 1926 and $28,511,847 from investments.

The income from investment in the General Motors Corporation was 128,941,598 in 1927, against $23,621,947 the year before, including the extra dividends in both years.

Current assets at the close of 1927 amounted to $70,529,985, which included $17,512,171 cash and $15,084,050 marketable securities, while current liabilities amounted to $8,868,905, representing a ratio of about 8 to 1.

Total investments of the company are carried at an aggregate of $175,726,737, and total gross assets of the company amount to $351,440,262. The direct holdings in General Motors common stock, together with the equity in holdings of the General Motor Securities Company, constitute 22.94 per cent. of the entire common stock of the General Motors Corporation. These holdings aggregate 3,992,488 shares, which is equal to 1½ shares for each share of du Pont common stock outstanding.

The value of du Pont investments in General Motors common was adjusted on the company's books in March, 1927, to $119,774,640, or $30 a share. The market value of these holdings at the present level of about $135 amounts to $538,985,880.

The du Pont Company paid total dividends of $15.50 a share on its common stock in 1927, of which $2 was accrued and charges against surplus of 1926. Total dividends paid from 1927 earnings on the common stock were $35,930,661. An extra dividend of $3.75 a share declared in 1927 and paid Jan. 4, 1928, is not included in this distribution.

The profit and loss surplus at the close of 1927 was $97,785,243, against $66,417,566 at the end of 1926, and includes a credit of $26,184,371 resulting from the increased value of the investment in General Motors.

According to President Lammot du Pont's report to stockholders, the company's volume of business for the year 1927 was about ten per cent. larger than the previous year, resulting in the increased earnings despite the fact that generally lower prices were received from the products. Sales of virtually every department showed an increase, though there was a slight falling off in commercial explosives due to the mid-western coal strikes.

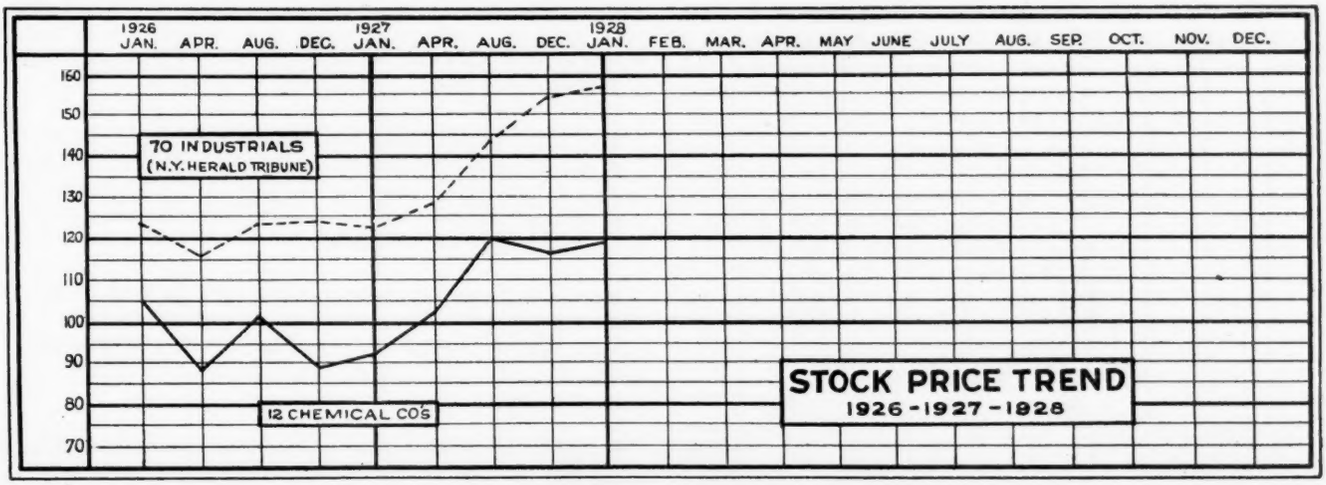
Sales of paint, varnish, dry colors, pigments, heavy chemicals and pyroxylin finishes expanded, with Duco showing a substantial increase over the previous year.

Rayon sales, through Du Pont Rayon Co., were substantially larger and during the year the capacity of the Buffalo plant was increased and another unit is being added to the Nashville plant. Plans are also in the making for an additional plant near Richmond, Virginia.

The Eastern Alcohol Corp. had a very successful year. Construction of a plant for the commercial operation of a new process for producing gylcerin by the fermentation of molasses has been started in connection with the alcohol production. This plant probably will be in operation by the middle of the year and will supply a substantial part of the du Pont Company's requirements of gylcerin. Eastern Alcohol Corp. is owned jointly by the du Pont Co. and by National Distillers' Products Corp.

Considerable progress has been made by Lazote, Inc. The company now owns in addition to the American patent rights to the Claude process, the Casale patents for North America, putting it in control of two important processes for the production of ammonia. Lazote began, also, the first American manufacture of syntehtic methanol.

Du Pont Company has discontinued its nitrate mining operations in Chile and has sold its properties in that country. It will, however, continue to import and sell nitrate of soda for agriculture and other purposes.



Wall Street and Chemicals

Monsanto's recapitalization proceeded all as per schedule. The proper papers have been filed in Missouri and the new permanent bonds have been issued thus winding up the financial reorganization which provided for the retirement of $4,000,000 preferred stock and the refunding of $2,239,200 of 7% bonds, with an increase from 62,000 to 110,000 of no par common and $2,000,000 of the new 5½% bonds. Since the common was placed on the market, two months ago, at 34, it has been creeping up, and is becoming quite a favorite in Chicago, disappointing those St. Louis prophets who advised short selling. Mr. Queeny, his associates, and the bankers have reason to be well pleased. Interest saved; a broader financial base; and a security line-up favorable to corporate alliances is enough to make everybody cheerful.

Nitrate stocks in London have been abooming on the bullish export statistics for 1927 which show a healthy jump since the break-up of the selling syndicate. A remission of some of the Chilean expert tax is also reported and the refunding of the Republic's 8% bonds, through National City, by means of a 6% railroads bond is also a favorable indicator. Capellen Smith of the Guggenheim interests assuredly did not choose just this time to visit the fields for a vacation or a health trip.

A dye industry executive, who is at once a good horseman and a good trader, said the other day, apropos of a recently issued stock circular; "I've been years trying to find out what the adjectives 'aged,' 'handy,' and 'Virginia bred' mean when applied to a hunter; but those definitions are simple compared with the meaning of 'elimination of non-recurring charges', 'estimated economies in operation' and 'depreciation based on value of acquired assets' when describing a consolidation.

Split-up stories about Allied are common in customers rooms, based not on the state of the chemical market, or the new Hopewell plant; or rumors of foreign alliances—all of which are common enough too—but upon the ticker records of stocks held as investment. From 61 Broadway comes repeated and insistent silence.

Announcement by American Cyanamide of two new lacquer solvents is taken as justifying a lot of shrewd, quiet buying of the "B" issue which has been going on for the past eighteen months, based on commercial developments to come out of the re-organized research department working in the new laboratories at the Warners plant.

It was erroneously reported in the January issue of CHEMICAL MARKETS that J. R. McIntosh who was instrumental in floating the issue of Acetol Products stock is connected with Hemphill, Noyes & Co., Mr. McIntosh is an independent counsel, with offices at 1 Wall St., New York.

Capitalization of chemical companies organized under laws of various states during December, 1927, amounted to $20,205,000, according to Journal of Commerce. This compares with $11,350,000 for corresponding month of previous year.

Chemical & Dye Corp. offers new issue of $500,000 first preferred 7 per cent. cumulative stock and 5,000 shares of common stock through P. H. Whiting & Co., Inc., and J. M. Byrne, Jr., & Co.

Certain-teed Products has been one of chemical fringe companies which has been much consolidated in rumors of late. Glidden and U. S. Gypsum have both denied these allegations.

Atlas Powder Earnings Decrease

Atlas Powder Co. for year ended December 31, 1927, reports net income of $2,044,230 after charges and federal taxes, equivalent after preferred dividends , to $5.75 a share earned on 261,438 shares of no par common stock. This compares with $2,381,295 or $7.04 a share in 1926.

Consolidated income account for 1927, compares as follows:

	1927	1926	1925
Net sales	$19,727,474	$20,545,323	$20,588,980
Cost and exp.	17,742,522	.....	.....
Op. prof.	$1,984,952	.....	.....
Other inc.	353,218	.....	.....
Total inc.	$2,338,167	.....	.....
Federal taxes	293,937	.....	.....
Net inc.	$2,044,230	$2,381,295	$2,130,534
Pfd. divs.	540,000	540,000	540,000
Com. divs.	1,045,737	1,307,160	1,045,722
Surplus	$458,493	$543,135	$ 544,812
P. & L. surplus	6,254,787	5,796,294	5,262,159

Texas Gulf Reports 25% Increase

Report of Texas Gulf Sulphur Co. for year ended December 31, 1927, shows net income of $12,099,375 after expenses, federal taxes, etc., equivalent to $4.76 a share earned on $2,540,000 no par shares of stock. This compares with $9,383,813 or $3.69 a share in 1926.

Income account for 1927, compares as follows:

	1927	1926	1925	1924
Gross inc.	$22,328,199	$18,152,030	$11,973,617	$9,814,976
Ex. fd. tax, et.	10,228,824	8,768,217	6,284,376	500,096
Net inc.	$12,099,375	$9,383,813	$5,689,241	$4,814,016
Dividends	10,160,000	7,620,000	5,556,250	4,762,500
Surplus	$1,939,375	$1,763,813	$132,991	$51,516
Previous surplus	9,004,088	7,240,275	7,107,284	7,055,768
*P. & L surplus	$10,943,463	$9,004,088	$7,240,275	$7,107,284

Nixon Nitration Works' $5,000,000 first mortgage, 6½% bonds due 1927 have been listed on the Baltimore Exchange. The company, (pyroxylin plastics) which was incorporated in 1918 in New Jersey, has a capitalization of $1,000,000 common stock, authorized and outstanding. Gross sales 1924, $1,460,933; 1925, $1,536,547; 1926, $1,717,176. Net earnings before depreciation and Federal tax $144,130 1925, $175,559; 1926, $139,721. The officers of the company are Lewis Nixon, President; Stanhope Nixon, Vice-President; D. F. Corbett, Treasurer and G. H. Murray, Secretary.

Jones & Laughlin Steel Corp. and subsidiaries report for year ended December 31, 1927, net income of $11,238,939 after interest, depreciation, depletion, federal taxes, etc., equivalent after preferred dividends, to $12.49 a share earned on 573,320 shares of common stock. This compares with $15,149,094 or $19.46 a share in 1926.

Mathieson Alkali Works, Inc., declares a quarterly dividend of $1.50 on common, placing the stock on an annual basis of $6, against $4 previously. The regular quarterly dividend of $1.75 was declared on the preferred. Both dividends are payable April 2 to stock of record March 16.

Sherwin-Williams Co. declares usual extra dividend of 12½ cents and regular quarterly dividend of 75 cents on common, payable Feb. 15 to stock of record Jan. 31. Regular quarterly dividend of $1.50 also declared on preferred, payable Mar. 1, to stock of record Feb. 15.

International Salt Co. reports profit of $118,456 for six months ended Dec. 31, 1927.

A. A. C. Sells Road to Retire Bonds

American Agricultural Chemical Co., which has leaded the Charlotte Harbor and Northern Ry. for a number of years to the Seaboard Air Line will transfer this property to railroad on the expiration of the present lease, March 1, 1928. Consideration is reported to be approximately $5,000,000.

With the proceeds will retire $6,000,000 of its outstanding 7½% bonds at 103½ to be called as of Feb. 1, next. The balance necessary for the retirement of the bonds will be taken from the company's treasury which showed cash holdings of $6,749,003 as of June 30 last.

Retirement of $6,000,000 bonds will leave a total of approximately $13,500,000 bonds outstanding, representing a reduction of $22,612,500 in the funded debt which aggregated $36,112,500 at the close of 1922. Retirement of these bonds was paid for out of the treasury, the sale of properties and as a result of an economical program on the part of the management.

American Agricultural Chemical has no bank loans outstanding and it is said to be the only leading fertilizer company that has kept out of the hands of the banks since the deflation period 1920.

Vanadium Corp.'s earnings are estimated at approximately $5 a share on its 376,736 capital shares against $5.26 in 1926. Decline is attributed to slack in automotive and locomotive industries, principal users of vanadium steel. According to present indications the company will be able to finance expansion into chemical field (CHEMICAL MARKETS, Jan. 1928) without borrowing, as working capital on June 30 last was $5,801,898. It also has about $3,000,000 invested in bonds and preferred stocks on which it has substantial paper profit.

National Lead Co.'s total sales are estimated at about 10 per cent. under 1926 total, which will make company's earnings considerably under 1926 level. Investments, however, are likely to show increase of several millions over last year's figures, due to purchase of Titan Co., Norway and Societe Industriale de Titane, France, making the company a powerful factor in control of titanium oxide production.

Royal Baking Powder Company has omitted the extra dividend of 2% on the common stock usually declared in January. In a statement to the stockholders, the management said that while operating income in 1927 exceeded that of 1926 it was deemed wise to conserve cash for possible future expansion. Extra dividends of 2% each were paid on the common stock on Dec. from 1915 to 1926.

Brompton Pulp & Paper Co., Ltd., Montreal, sells 10,000 additional shares of stock and disposes of Groveton plant at reported net proceeds of over $1,000,000, placing company in exceptionally strong financial position.

Clorax Chemical Co., Oakland, Cal., issues 2,400 shares of stock in form of stock dividend. Authorized capital consists of 10,000 shares, par $100. Net value tangible assets Nov. 30, 1927, was $540,260.

Henry M. Miner & Son incorporates with $100,000 preferred stock and 500 shares no par common. Henry M. Miner was formerly president, Miner-Edgar Co.

New Process Cork Co., Inc., called for redemption Feb. 1 all outstanding 5-year 6½% sinking fund gold notes, dated July 1, 1925, due July 1,1930, at 101½ and interest at New York Trust Co.

Delaware Rayon Co. increases capitalization $450,000 as part of expansion plan to increase plant capacity 100 per cent.

Merrimac Adds $149,274 to Surplus

Merrimac Chemical Co. report for the year ending Sept. 30, 1927, shows the following balance sheet.

Assets	1927	1926
Land, bldgs., etc., less reserve	$3,353,509	$3,175,319
Other Assets	113,668	55,347
Cash & accts. reserve	977,180	1,197,961
Sec. owned	1,183,596	1,128,132
Inventories	1,123,749	1,042,233
Purch. sales cont.	.....	7,403
Deferred assets	124,554	146,126
x Includes reserve for Federal taxes.		
Liabilities	1927	1926
Capital stock	$3,528,000	$3,528,000
Accounts payable	336,859	269,201
xItems accrued not due	147,992	205,040
Reserves	647,184	683,295
Surplus	2,216,222	2,066,984
Tot. (each side)	$6,876,257	$6,752,520

P. & G. Sell $5,000,000, 4½% Bonds

Proctor & Gamble offered for sale, Jan. 12, through the First National Bank, $5,000,000 of 4½% debentures due 1947 at 100 and interest. These debentures, of which $11,000,000 are outstanding, constitute the sole funded debt and are followed by $2,250,000 8% preferred stock, $6,689,800 6% preferred stock, and 1,250,000 shares of common stock. Market value of the common, based on published quotations, is over $300,000,000, and dividends are being paid at rate of $8 a share per annum, cash dividends having been paid without interruption since 1891.

Gross sales have increased from $105,655,385 in year ended June 30, 1922, to $191,776,977 in year ended June 30, 1927, when net earnings available for interest amounted to $15,004,975, or 30.31 times interest requirements on this issue of debentures. Net tangible assets, after all indebtedness, amounted to over $73,000,000 as of June 30, 1927, when net current assets were $52,363,000, or 4.7 times this issue.

Hewitt Bros. Soap Co., Dayton, reorganizes Jan. 17, with James M. Hewitt, president, Martin F. Schultes, vice-president Lyman G. Holsey, treasurer, and Samuel L. Finn, secretary. Other directors are I. G. Renner, L. H. Gebhart and Frank Dinwiddie. Control of the company has been purchased by employees and present officers.

Du Pont Rayon's new mill at Richmond, Va. will have a capacity of 3,500,000 pounds annually and will cost from $8,000,000 to $10,000,000 before completion, fully equipped. The company recently bought some 450 acres, on the Peterborough Pike, three miles from the city.

Hercules Powder Co. reports for year ended Dec. 31, 1927, net income of $3,203,895, equivalent to $16.37 share earned on 147,000 shares common stock. This compares with $3,433,419 or $18.18 a share in 1926.

Du Pont Rayon Co. has increased its preferred stock from $10,000,000 to $25,000,000; additional capital to be used in expansions, particularly at new mill at Richmond, Va.

Fabriche Italiane Materie Coloranti Bonelli decides against increase in capital from 45,000,000 lire to 60,000,000 lire as announced March 1927.

Clorox Chemical Co., San Francisco, distributes stack dividend of $240,000.

Bonds Called for Redemption

Agri. Mtge. Bank, (Rep. of Colombia) gtd. 20 yr. 5s, 1947	Jan. 15, 1928
Alpine Montan Steel Corp., 1st 7s, 1955	Mar. 1, 1928
Amer. Agri. Chem. Co., 1st ref. (now 1st) 7½s, ser. A, 1941, 1st ref. 7s	Feb. 1, 1928
Bassick-Alemite Corp. coll. tr. ser. 7% notes, 1929-1932	Feb. 1, 1928
Bohn Aluminum & Brass Corp. 1st 7s, 1934	Mar. 1, 1928
California & Hawaiian Sugar Ref. Corp. 1st 7s, 1937	Feb. 1, 1928
Canada Carbide Co., Ltd. 1st 30 yr. 5s, 1941	Jan. 1, 1928
Canada Cement Co., Ltd. 1st 20 yr. 6s, 1929	Mar. 3, 1928
Cespedes Sugar Co. 1st 7½s, 1939	Mar. 1, 1928
Crown Cork and Seal of Baltimore, 1st 20 yr. 6s, 1942	Feb. 1, 1928
Eastern Coke Co., 1st 14 yr. 5s, 1931	Feb. 1, 1928
Franklin Fluorspar Co. 10 yr. 6% notes, 1934	Feb. 1, 1928
Hudson Valley Coke and Prod. Corp., 1st 15 yr. 7s, 1949	Feb. 1, 1928
Lake Superior Paper Co., Ltd., 1st 30 yr. 6s, 1941	Mar. 1, 1928
Mid-Continent Petroleum Corp., 1st 15 yr. 6½s, 1940	Mar. 1, 1928
Monsanto Chemical Works, 1st 7s, 1929-1940	Feb. 1, 1928
National Breweries, Ltd., 1st 30 yr. 6s, 1939	July 1, 1928
New Process Cork Co., Inc. 5 yr. 6½s, 1930	Feb. 1, 1928
Parraffine Cos., Inc. 1st ser. B	Feb. 1, 1928
Phenix Cheese Corp. 5 yr. deb. 6s, 1929	Mar. 1, 1928
Pittsburgh Steel Prod. Co., 1st 6s, 1937	Feb. 1, 1928
Port Alfred Pulp & Paper Corp. 1st 6s, ser. B and 6½s, 1943	Apr. 1, 1928
Rima Steel Corp. 1st 7s, 1955	Feb. 1, 1928
Shawinigan Water & Power Co. 1st ref. 5½s, 1954, 1st & ref. 5s, ser. E., 1955	Apr. 1, 1928
Southern Paper Co., 1st 6½s, 1937	Feb. 29, 1928
Spanish River Pulp & Paper Mills, Ltd. 1st 6s, 1931	Jan. 1, 1928
Sun Oil Co., 15 yr. deb. 5½s, 1939	Jan. 20, 1928

Stocks Sold at Auction

Wed., January 11, 1928	$ per share
R. L. Day & Co., Boston	
165 Amer. Glue Co., com	40
35 Amer. Glue Co., com	42
Wise, Hobbs & Arnold, Boston	
6 Merrimac Chemical Co., par $50	86
Wed., January 25, 1928	
Barnes & Lofland, Phila	
4 Amer. Druggist Synd., par $10	5
Wise, Hobbs & Arnold, Boston	
35 Amer. Glue Co.	39

Glidden Co. Profits Off Slightly

Glidden Company reports net profit for fiscal year ended October 31, 1927, of $1,712,438, equivalent, after prior preference dividends, to $3.03 on the 400,000 shares no par common, which compares with $1,861,945 or $3.41 in 1926. Depreciation provisions for 1927 fiscal year were increased from $323,260 to $371,251, accounting for a considerable part of the decline in net income. The fact that net income held up as well as it did in the face of lessened demand from automobile manufacturers is attributed to new business in other lines which enabled the company to close the year with total sales volume of over $25,500,000.

During the year Glidden Company made progress through installation of manufacturing facilities, diversification of markets and products and control of operations through budget plan. New equipment will allow for 25 per cent increase in production with but little additional labor costs. Three new stores were added to the retail and service store division and plans call for operating additional units this year as conditions warrant. The chemical and pigment division completed building program, the plant at Oakland, Cal., now being in operation, and notwithstanding interruptions due to construction, this division's profits were better than in 1926. The addition to the edible oil refinery was completed; Euston lead division operated at a profit; and Barytus mining operations were successful. Zinc mining properties in California incurred small loss due to prevailing low prices of ore and high cost mining development.

During the year the company strengthened its financial condition. Current assets totaled $8,950,355, and current liabilities $1,222,088, making working capital $7,728,267, as compared with $7,480,910 in 1926. Cash on October 31 amounted to $599,841, an increase of $154,739. Notes and accounts receivable after allowance for doubtful accounts, totaled $3,572,560, compared with $4,002,472, while inventories were valued at $4,756,836, compared with $5,283,910.

The Industry's Bonds

1928 Jan. 31 Bid	1928 Jan. 31 Asked	1928 High	1928 Low	1927 High	1927 Low	Total Sales Jan.	Total Sales 1927	ISSUE	Date Due	Int. %	Int. Period	Orig. (1) Offering $
					NEW YORK STOCK EXCHANGE							
106	105½	106	104½	105	99	324	2,453	Am. Agri Chem	1941	7½	F. A.	30,000
102½	102	102½	101	103½	100½	215	2,935	Am. Smelt & Refin "A" 5%	1947	5	A. O.	...
108	107½	108½	107½	108½	107½	155	963	Am. Smelt & Refin "B" 6%	1947	6	A. O.	...
106	105½	106½	105½	105½	103½	851	6,384	Anaconda Copper Mng	1953	6	F. A.	100,000
111½	111½	113	111½	116½	106½	943	6,454	Anaconda Copper Mng	1938	7	F. A.	50,000
103	102½	103	96½	97	87	981	2,507	Anglo Chilean	1945	7	M. N.	16,500
103½	103	103½	102½	103½	100½	100	891	Atlantic Refin	1937	5	J. J.	15,000
103	104½	103	102	102½	100½	21	148	By product Coke	1945	5½	M. N.	8,000
...	...	102½	102½	104½	101½	1	409	Corn Product Refin	1934	5	M. N.	10,000
...	...	...	...	101½	90	...	647	Davison Chem Deb	1931	6½	J. J.	3,000
114	114	117	109	111½	106	294	926	General Asphalt	1939	6	A. O.	5,000
...	...	92	90	91½	81½	35	203	Int. Agric. Corp	1932	5	M. N.	30,000
...	...	81	80	...	...	12	345	Int. Agri. Corp. stamped, extended	1942	5	M. N.	7,020
126	126	133	125½	133½	104	551	6,329	Lig. Carbonic Corp	1941	6	F. A.	5,000
107	106½	107	100½	102	98½	960		Montecatini	1937	7		
95½	95	95½	94½	95½	92½	41		Ex War	1937	7		
113½	...	114½	113½	115	113½	6	1,931	People's Gas & Coke	1943	6	A. O.	10,000
105	...	106	105	105½	101½	24	621	Refunding	1947	5	M. S.	40,000
...	...	...	...	99½	96	196	...	Solvay Am. Invest. Corp	1942	5	M. S.	15,000
103½	103½	104	103	104½	101½	450	8,711	Standard Oil N. J.	1946	5	F. A.	120,000
100½	100½	104	101½	101½	98½	87	720	Tenn. Cop. and Chem	1941	6	A. O.	3,000
91	91	91½	91	95½	91	4	175	Va. Iron C. & C				
					NEW YORK CURB							
99	98½	99½	97½	99½	95½	8	1,456	Agri. Mtge. Bk. of Col	1946	7	J.O.	...
98½	98½	98½	97	99½	96	1	1,316	Agri. Mtge. Bk. of Col	1946	7	J.J. 15	3,000
...	...	...	...	101½	99	...	852	Alum. Co. of Am.	1933	7	M. S.	60,000
102½	102	102½	101½	105½	105	503	9,696	Alum Co. of Am	1952	5		
95	95	95½	94½	101½	99	206	927	American Cyan	1942	5	A. O.	5,000
101½	101½	101½	101½	102½	101½	110	1,843	Anaconda Cop	1929	6	J. J.	25,000
100½	100½	100½	99½	99½	95½	481	799	Koppers Gas and Coke	1947	5	J. D.	25,000
...	...	103½	102½	103	98	30	937	Natl. Dist. Prod	1935	6½	J. D. 15	3,500
97½	97½	97½	96½	98	95½	1268	2,882	Shawinigan W & P	1967	4½		
...	...	...	...	100½	100	1	11	Silica Gel	1952	6½		
99½	99	99½	98½	99½	96	...	3,060	Solvay & Co	1942	5	M. S.	15,000
101½	101½	101½	100½	100½	99	339	3,825	Swift & Co	1932	5	A. O.	50,000
...	...	...	...	99	90	...	...	U. S. Ind. Alc	1941	6½	M. N.	...
...	...	103	102	103½	98½	64	1,795	Westavco Chlorine Prod	1937	5½	M. S.	2,500
					BOSTON							
...	...	...	...	105	97½	...	6	Amer. Agri. Chem	1941	7½	F. A.	30,000
...	...	103	102½	102½	101	18	305	Swift and Co	1944	5	J. J.	50,000
					CHICAGO							
...	...	103	102½	103½	101½	24	185	Swift and Co	1944	5	J. J.	50,000
...	...	...	...	101½	99	...	88	Westavco Chlorine Prod	1937	5½	M. S.	2,000

New Incorporations

Formafume Chemical Co., Inc., New York, $100,000. disinfectants, germicides and chemicals.

Simpson Chemical Corp., Rochester, New York $20,000 preferred, 500 shares no par common.

Henry M. Miner & Son, Newark $100,000 preferred, 1,500 shares no par common.

Page Chemical Co., Warrenton, N. C. $40,000 C. E. Jackson, W. N. Boyd.

Shawinigan Chemical Corp., Ltd., Montreal 1,000,000 shares no par. Gordon W. MacDougall, William F. MacKlaier, Francis R. Scott.

International Industrial & Chemical Co., Ltd., Montreal, $75,000 Kenneth Archibald, Winchester H. Biggar, Darley B. Smith.

Acme Tank Car Corp., New York, $1,000 shares no par.

New Process Chemical Co., Wilmington, $50,000.

S. Oppenheim, New York, $20,000. Paints and Dyes.

Dr. A. W. Chase Co. Delaware, 5,000 shares no par Chemicals, drugs, medicines.

Janome Rayon Corp. Brooklyn, $150,000 Alexander Kushman.

Elite Chemical Co., New Haven, $50,000.

American Acetate Silk Corp. Albany, $1,000.

R. E. M. By-Products Corp. Wilmington, $5,000,000. Aniline dyes.

Canadian Refractories Ltd., Montreal, $50,000. Magnesite. Brinley V. Lewis, Charles B. Brown, Tom Gould.

Marx & Rawolle Ltd., Montreal, $10,000. Chemical preparations. George G. Hyde, John G. Ahern, George B. Pudicombe.

Doranol Products Ltd., Toronto, $2,000,000 shares no par. Chemicals. Frederick H. Roberts, Leonard A. Richard, Glenn A. Sullivan.

Macasphalt Corp. of America. Delaware. $700,000. Chemicals.

Marl Fertilizer & Chemical Corp., Wilmington, $100,000 shares common.

Pratt & Lambert, Inc., reports for year ended December 31, 1927, net profit of $1,325,656 after depreciation, federal taxes and reserves, equal to $6.54 a share earned on 202,500 shares of no par stock. This compares with $1,339,503, or $6.61 a share in 1926.

Balance sheet as of December 31, 1927, shows total assets of $7,343,157, compared with $6,872,952 at end of 1926, and profit and loss surplus $2,715,334 against $2,199,678. Current assets totaled $4,768,832 and current liabilities $927,823 as compared with $4,241,296 and $973,274 respectively, at end of previous year.

The Industry's Stocks

1928 Jan. 31st Bid	1928 Jan. 31st Asked	1928 High	1928 Low	1927 High	1927 Low	Sales In Jan.	Sales Since Jan. 1, '27	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1927	Earnings $-per share-$ 1926
185	187	198½	178	199½	134½	36,900	455,833	Air Reduction	No	223,445	$5.00	9 mo. 8.97	10.83
154½	155½	158½	151½	169½	131	178,400	3,695,266	Allied Chem. & Dye	No	2,178,109	6.00		9.79
123	123½	123½	122½	124	120	1,160	24,733	7% pfd	100	392,849	6.00		61.28
18	18½	21⅛	18	21½	8½	36,120	279,066	Am. Agricultural Chem	100	333,221	2.00	Nil	...
62½	63	71⅛	62	72¾	28½	37,720	378,066	pfd	100	284,552	1.50		3.59
76⅜	76½	78	70½	77⅜	43⅜	796,920	7,528,433	American Can	25	2,473,918	2.00		4.38
139	140	140	136½	141½	126	2,660	26,916	pfd	100	412,333	7.00		33.31
68½	68½	69½	56⅜	72½	20½	98,020	1,062,966	American Linseed	100	167,500	...		...
92	92½	93½	86½	92½	46⅜	10,980	216,550	pfd	100	167,500	7.00	7 mo. 6.00	.62
44⅜	45	46½	42	49⅛	36½	29,020	224,866	American Metal Ltd	No	594,278	4.00	9 mo. 2.54	3.88
116½	118½	117½	110½	113½	108	4,208	6,156	pfd	100	50,000	7.00	9 mo. 35.51	53.15
175½	175½	184½	172½	188⅛	132½	166,920	4,567,133	Amer. Smelt and Refin	100	609,980	7.50	6 mo. 11.08	23.38
134½	135	134½	131⅛	133	119½	3,980	35,710	pfd	100	500,000	7.00	6 mo. 17.01	35.52
9½	9⅞	10½	6⅜	10½	5¼	22,500	80,800	Amer. Zinc & Lead	25	193,120	...	9 mo. Nil	...
64	65	64	40	51½	35	36,240	119,600	pfd	25	96,560	...	9 mo. 2.31	...
56	56⅜	59½	53½	60½	41½	218,920	1,493,400	Anaconda Copper Mining	50	3,000,000	3.00		4.74
58	59	61	56	63	38	12,180	132,443	Archer Dan. Mid	No	200,000	...	6.51	6.35
112½	114	114	113½	112⅜	106	50	3,347	pfd	100	43,000	7.00	37.31	35.23
65	67½	67⅜	63	70	56½	5,000	25,593	Atlas Powder Co	No	260,393	4.00	5.75	7.04
106	107	106	102½	107	98	318	6,398	pfd	100	90,000	6.00	6 mo. 10.58	26.46
107	107½	109⅞	105½	131⅜	104	31,780	1,000,933	Atlantic Refining	100	500,000	...	9 mo. Nil	11.24
4½	4¾	4⅜	4½	5½	3¾	12,720	109,700	Butte Copper & Zinc	5	600,000	.50	9 mo. 0.09	.32
9½	10	10½	9	11½	7⅜	5,160	126,433	Butte Superior Mng	10	290,197	2.00	9 mo. 0.70	1.71
70½	72½	74¾	68	92½	66	4,820	163,600	By Prod. Coke	No	189,931	3.00	9 mo. 5.14	9.16
2½	2½	2⅜	1½	2⅜	1½	44,360	125,133	Calla Lead & Zinc	10	723,355	...	9 mo. 0.08	...
21½	22	23⅜	20½	24½	14½	97,620	378,300	Calumet & Hecla	25	2,005,502	1.50	9 mo. 0.13	.75
60½	61½	62½	54½	55½	42	184,620	718,833	Certainteed Prod	No	307,000	4.00	9 mo. 4.85	6.02
120	119	120	121	118½	106	1,300	4,800	1st pfd	100	43,000	7.00	9 mo. 44.82	54.30
40½	40½	42⅞	40	44⅜	33½	131,320	1,380,733	Chile Copper	25	4,435,595	2.50	6 mo. 1.26	2.65
92½	93⅞	98½	90½	101½	66½	21,340	354,133	Columb Carbon	No	204,131	4.00	9.41	6.51
162	165	169½	157½	203	145	20,600	382,220	Commercial Solvents	No	108,861	4.00	9 mo. 7.58	14.13
85½	85½	87½	80½	86⅞	58¾	73,160	247,200	Cont. Can	No	620,000	6.00	7 mo. 4.55	6.36
125	126	126½	123⅜	126	120	330	3,650	pfd	100	52,930	7.00	7 mo. 47.07	70.55
68⅜	69½	71⅛	64⅜	68	46⅜	314,700	2,910,725	Corn Products	25	2,530,000	2.00	9 mo. 2.69	4.03
138½	140	138½	140⅜	142½	128	1,000	14,206	pfd	100	250,000	7.00	9 mo. 32.50	47.73
42½	43	46⅜	41½	48½	26½	101,160	919,100	Davison Chem	No	310,000	...		...
49	49⅜	50⅜	40	42⅞	36½	99,800	126,466	Devoe & Rayn A	No	95,000	2.40	(†) 5.47	5.22
113⅜	114	115½	108	114½	101	20	3,130	1st pfd	100	18,096	7.00	6 mo. 30.41	49.70
116½	118	120½	116½	118	105½	2,540	35,100	Dupont deb	100	795,212	6.00	9 mo. 45.45	52.51
314	316	323¼	310	343⅞	168	39,960	1,996,300	Dupont de Nemours	No	2,661,658	9.50	15.45	13.98
164½	164¾	169¼	163½	175½	126½	13,340	1,364,700	Eastman Kodak	No	2,055,340	5.00		9.50
129⅜	130	130	129	131½	119½	172	2,173	pfd	100	61,657	6.00		322.11
94	95½	95	91½	97	75½		30,200	Fed. Mining & Smelting	100	50,400	...		35.95
72½	73	74½	68½	71½	46½	327,620	3,246,500	Fleischmann	No	4,500,000	3.00	4.30	4.08
102	102½	109½	100½	106⅜	34	270,220	4,443,100	Freeport Texas	No	729,733	4.00	9 mo. 1.47	2.48
85½	86	83½	81	96⅜	65	461,600	2,539,100	General Asphalt	100	243,550	...	6 mo. 0.61	8.11
129½	135	140½	126	144½	107½	5,400	38,700	pfd	100	68,742	5.00	6 mo. 4.20	27.58
23½	23½	23⅜	20⅜	22	14½	133,780	497,900	Glidden	No	400,000	2.00	3.03	3.41
97½	98	98	95	101	86	3,116	19,300	pfd	100	71,922	7.00	6 mo. 7.35	25.98
94½	95	98½	71	78⅜	42	387,820	1,093,900	Gold Dust	No	318,586	...	6.20	3.01
68	68⅞	69½	65½	70⅜	43½	14,840	267,400	Household Prod	No	575,000	3.50	6 mo. 2.64	5.22
14	14½	15⅝	13⅜	16⅜	6½	9,800	107,800	Intern. Agri	No	441,695	...	Nil	1.60
57	59	60	56½	65	33	3,400	75,200	pfd	100	100,000	...	Nil	14.06
97½	98	99½	81½	89½	38½	953,400	5,847,700	Intern. Nickel	25	1,673,374	2.00	9 mo. 2.26	3.00
112	113	112	110½	110	103⅜	200	3,470	pfd	100	89,126	6.00	9 mo. 46.94	62.35
64	68½	65½	68⅜	75	63	148	2,696	Intern. Salt	100	60,771	6.00	6 mo. 2.64	8.35
73½	73⅜	77⅛	72	78½	45	89,700	406,800	Liquid Carbonic Corp	No	125,000	3.60	5.90	11.34
148½	50	51½	46	58½	43	2,140		Mac and Forbes	No	376,748	2.00	9 mo. 2.36	3.30
125	127	131⅜	118½	132½	82	40,860	352,400	Matheison Alk	No	147,207	6.00	9 mo. 8.48	9.88
116	117	115	116	120	103	170	1,720	pfd	100	24,750	7.00	9 mo. 55.68	67.85
18⅜	18½	19½	17½	20½	13½	20,700	228,300	Miami Copper	5	747,114	1.50		1.52

† Combined A and B

1928 Jan. 31st Bid	1928 Jan. 31st Asked	1928 High	1928 Low	1927 High	1927 Low	Sales In Jan.	Sales Since Jan. 1, '27	ISSUES	Par $	Shares Listed	An. Rate	Earnings $-per share-$ 1927	Earnings $-per share-$ 1926
54½	54¾	58½	51½	56½	17	134,840	1,418,400	National Dist. Prod	No	167,651	...	9 mo. Nil	...
67½	68	63½	71¼	69¾	43	9,860	113,400	pfd	No	109,795	...	9 mo. 1.62	...
131	135½	136	126	202¾	95	8,780	310,600	National Lead	100	206,554	8.00		34.34
139	139½	139	139	139½	131½	1,020	7,900	pfd A	100	243,676	7.00		36.95
113½	116	116	113½	116½	104½	780	23,215	pfd B	100	103,277	6.00		
26½	27	28¾	22¾	27½	19½	97,800	395,700	Penick & Ford	No	433,773	...	9 mo. 1.48	1.37
179	180	181	157	168¾	126	55,580	2,701,200	Peoples Gas Chi	100	60,000	8.00	10.22	11.04
41½	42½	43¾	41½	43½	36	27,820	146,800	St. Joseph Lead	10	1,951,517	2.50	1.85	4.21
39½	39½	40½	38½	41½	35½	210,220	2,274,700	Standard Oil Co of N. J	25	24,262,532	1.00		5.01
29½	29¼	31½	29½	34½	29½	217,080	1,478,700	Standard Oil Co. of N. Y	25	17,023,928	1.60		1.94
10½	11	11½	10½	13½	8½	15,300	392,000	Tenn. Cop. & Chem	No	794,624	1.00		1.31
74½	74½	80½	73½	81½	49	737,440	8,389,500	Texas Gulf & Sulfur	No	2,540,000	4.00	4.76	3.69
141½	141½	145½	138	154½	98½	131,100	3,006,400	Union Carbide	No	2,827,470	6.00	9 mo. 6.64	9.07
6	7	6	6	10	3½		2,980	United Dyewood	100	139,183	7.00	9 mo. Nil	...
47½	57	47	45½	49	36½	190	3,943	pfd	100	39,500	...	6 mo. 2.72	3.88
106½	106½	110½	102½	111½	69	106,680	1,416,500	U. S. Ind. Alc	100	240,000	5.00		7.04
117½	119½	120½	119	121	107½	400	785,900	pfd	100	60,000	7.00		35.16
47½	48½	49½	44½	48½	26½	16,890	261,900	Va. Car. Chem Com. 6% pfd	100	213,350	...		6.73
90½	91½	91½	88½	91	73	4,790	39,900	7% pfd	100	142,910	7.00		17.54
High	**Low**							**NEW YORK CURB**					
30½	30½	31½	29	31½	30	13,420		Acetol Prod	No	60,000			
128½	126½	129½	120	145½	67½	12,520	71,366	Aluminum Co. of America	No	1,427,625	...		...
38	38½	36	36½	35½	34	100	400	Aluminum Mf'g Co	No	325,860	2.00		...
45	45	45	39½	40½	26	1,060	1,200	Amer. Cyan. "A"	20	65,943	1.20	3.09	3.49
45	45½	50	39	43½	25	60,440	56,300	"B"	20	263,772	1.20	3.09	3.49
15½	15½	17½	14	18½	3½	26,840	259,133	Amer. Rayon Prod	No	110,000	1.00		Nil
28	27½	28	26	29	11	11,940	44,430	Amer. Solvents & Chem. pfd	No	160,000	...		Nil
27½	27½	31½	27	31½	14	11,860	224,100	Anglo Chile Nitrate	No	1,756,750	...	Loss	Loss
(e)36½	36½	39½	37½	43½	22	480	43,833	Canad. Ind. Alc	No	800,000	1.28	2.49	2.63
91½	86	100½	86	117	44	14,420	321,408	Celanese Corp of Am	No	1,000,000	...		1.80
104½	102	114	100	129½	60	5,400	68,083	Celluloid Co	100	70,980	...		...
93	93	94	89	133½	113½	1,280	24,093	pfd	100	24,551	...		...
84½	84½	87½	84	91	84	620	18,683	Celotex pfd	No	164,730	3.00		5.06
(e)135	144	149½	117½	126	76½	5,520	20,000	Chesebro Mfg Co	25	120,000	4.00		8.06
37	37	39½	37½	38½	24½	4,980	34,686	Courtaulds	£1	£12,000,000	16½%		18.18
(e)192	197	195	192	202	180	68	590	Hercules Powder	100	147,000	16.37	9 mo. 12.09	18.18
(e)119	121	...	...	121	114	18	1,423	pfd	100	111,392	7.00		30.82
...	...	9	7½	10	7½	780	28,500	Heyden Chem	10	150,000	...		0.32
20½	20½	22½	18½	24½	4½	83,280	1,088,133	Indus. Rayon "A"	No	452,544	...		2.27
122½	122	124½	114½	126½	55½	111,660	1,459,800	Johns-Manville	No	750,000	...		4.34
43	43	46	38½	39	37½	1,960	2,266	Monsanto Chem	No	110,000	8.09	9 mo. 5.17	5.60
194	188½	190	180½	194½	178	1,938	12,690	N. J. Zinc	100	490,816	8.00		14.34
94½	94½	95½	93½	112	60½	3,840	52,658	Palmolive Peet	No	1,500,000	...		2.86
(e)94	97	100	95	105½	84	505	4,317	Penn Salt	50	150,000	5.00	8.09	6.08
9	9	9¾	9	14½	8	1,680	20,043	Pyrene Mfg	10	223,158	2%	6.42	2.38
(e)275	285	287	236	335	160	775	14,285	Royal Baking Powder					
(e)107½	109½	108½	104	110	100	200	4,740	pfd					
(e)66	69	...	...	68½	44	125	10,425	Sherwin William	25	594,445	3.00	6.42	5.59
19	19	19½	17½	20½	13½	8,120	58,533	Silica Gel	No	600,000	...		...
78½	77½	...	...	81½	64½	115,220	2,073,800	Standard Oil Co. of Indiana	25	9,136,618	...		6.03
(e)66	69	9½	8½	12	5		9,500	Snia Viscosa	150 lire	6,666,666⅔	.72		6.86
(e)17	17½	17½	16½	21	13½	200	5,760	Swan & Finch	25	34,458	.87½		...
128	127½	128½	125	130	115½	5,330	26,817	Swift & Co	100	1,500,000	8.00		10.43
478	465	505	460	499	145	2,638	67,201	Tubize "B"	No	78,868	...		...
84½	85	92	83	110½	82½	2,315	29,892	U. S. Gypsum	20	687,875	8%		11.35
70½	69½	73	70	77	50½	10,600	153,745	Wesson Oil and Snow	No	300,000	4.00	5.26	8.71
Bid	**Asked**							**CLEVELAND**					
...	...	...	...	27½	30		100	Am. Vitrified Prod	50	70,000	7.50		2.19
104	106	104	106	115	74½	426		Cleve-Cliff Iron	No	400,000	4.00		
140	140	112½	140	108	70	214	1,018	Dow Chem	No	100,000	4.00		...
...	...	106	107	106½	100	30	639	pfd	100	30,000	7.00		...
22½	22½	24½	22½	21½	15½		375	Glidden	No	400,000	2.00	2.25	3.41
97½	97½	97½	96	100	84	555	3,126	pfd	100	71,922	7.00	6 mo. 7.35	25.98
130	132	130	135	135	127	336	2,399	Grasselli	100	215,704	...		10.24
102½	108½	108	109	109½	102½	1,047	4,846	pfd	100	123,742	6.00		23.68
...	...	19	20½	24½	4½	416	39,744	Indus. Rayon "A"	No	452,544	...		2.27
65	68	66	69	70	44	1,057	16,722	Sherwin William	25	594,445	3.00	6.42	5.59
108	110	108½	109½	109	104	371		pfd	100	125,000	6.00		
								PITTSBURGH					
...	...	24½	25	33½	18	536	2,910	Am. Vitrified Prod	50	70,000	7.50		2.19
								CHICAGO					
56	56	60	52½	86	53	3,768	98,024	Celotex	No	170,456	3.00		
85½	85½	87½	85	92	82	787	13,314	pfd	100	52,534	7.00		
43½	43½	46	38½	39	37	12,167	26,498	Monsanto Chem	No	110,000	...	9 mo. 5.17	5.60
...	...	...	...	156½	127	...	321	People's Gas					
128	127½	129	124½	130	115½	7,440	114,458	Swift & Co	100	1,500,000	8.00		10.43
...	...	143½	139½	152½	99	175	11,373	Union Carbide	No	2,827,470	6.00	9 mo. 6.64	9.07
83½	82½	93	83½	110½	82	10,927	202,171	U. S. Gypsum	20	687,875	8%		11.35
Bid	**Asked**					(f)		**CINCINNATI**					
...	...	...	...	125½	113½	104	360	Fleishmann pfd	100	12,295	6.00	4.30	4.08
251	253	275	249	250	177	4,001	43,825	Proc. & Gam	20	1,250,000	4.75		9.17
62½	66½	66½	60	62½	38	3,504	12,419	United States Can	No	62,500	...		3.00
180½	101½	101½	100	103	97½	522	2,071	pfd	100	20,000	7.00		15.20
High	**Low**							**BOSTON**					
...	...	...	...	54	35½	...	728	Am. Agri. Chem. pfd					
21½	21½	23½	20½	17½	14½	24,383	166,075	Calumet & Hecla	25	2,005,502	1.50	9 mo. 0.13	.75
...	...	...	...	120½	82½		1,420	Math Alk					
128½	127½	128½	124½	130½	115	1,879	22,317	Swift & Co	100	1,500,000	8.00		10.43
						(f)		**ST. LOUIS**					
119½	119	119½	118½	...	...	194		Certainteed Prod. pfd	100				
46	46	47½	47	36	36	866	3,168	South Acid and Sulfur Co	No	52,000	3.00		...
								PHILADELPHIA					
95	95	100½	92	105½	74½	1,507	37,437	Penn. Salt	50	150,000	5.00	8.09	6.08
116	115½	117½	111½	118½	89½	83,923	829,285	United Gas Imp	50	2,130,088	...		4.59
Bid	**Asked**							**MONTREAL**					
34	34½	...	...	39½	20			Asbestos Corp	No	200,000	1.50		1.02
...	...	...	...	98	82½			pfd	100	74,561	7.00		
36½	36½	...	...	43½	21½			Canada. Ind. Alc	No	(d)800,000	1.28	2.49	2.63
92½	92½	...	...	*277½	67			Shawinigan W. & P	No	1,100,000	2.00		
...	...	...	...	207	142			Sherwin William of Can	100	40,000	6.00	8.84	9.54
...	...	...	...	127	117			pfd	100	34,350	7.00		
						(f)		**BALTIMORE**					
...	...	...	...	39½	37		1,340	Davison Chem	No	310,000	...		...
19½	19½	19½	18½	20½	15	5,835	19,836	Silica Gel	No	600,000	...		...
								UNLISTED					
157	162	...	...	...	...			Casein Co	100	21,196	7.00		7.10
77	80	...	...	89	55			Merck & Co pfd	100	33.950	4.00		7.60
86	...	...	...	...	...			Merrimac	50	70,560	...		...
141	145	...	...	...	...			Newport Chem	1	912,198	4%		

*Old stock. † Combined A & B. (b) June 18 to Dec. 30. (d) 1927 earnings on 969,480. (e) Bid & Asked. (f) Thru Jan. 28 (g) High low.

The Trend of Prices

Volume of Business Has Been Limited During the Past Month

Weakness in Dynamite Glycerin Has Been Feature of Generally Quiet Market—Mercury Also Continues to Ease Off—Ammonium Chloride Quiet—Alcohol Fairly Steady—Calcium Chloride Lower on Competition—Tallow Oil Declines—Fertilizer Market Generally Firm.

During a good portion of the month of January and early in February, there has been a noticeable slackening in the consuming demand for practically all items. This is a normal condition for this season of the year when following the rush of contract business during the closing days of last year and the first few days of the new year, there is a natural let down in the rush of business. As a result of these conditions the position of most of the markets have shown little change during the month and the scope of the price movements of those items which did show activity was very limited.

At this time last month interest was centered in ammonium chloride, alcohol, glycerin and mercury in the chemical group. Of these, glycerin and mercury have continued their downward movements, while ammonium chloride and alcohol have been marking time from the angle of price change. The sharp drop in the price of dynamite glycerin to a level of 11½c per pound, has been the outstanding item of the month. This weakness is attributed in most quarters to the surplus of stocks which continues in evidence as has been the case during the entire year past. It is true that at these levels there has been some buying among the powder people, as this is looked upon as an advantageous level at which to purchase. This however, has not been sufficient to check the downward movement.

The continued downward trend of mercury though not from the same cause as glycerin has likewise been steady. In this case the market has been receding from a level which had not been attained for years past. The reductions on this market have been based on the slow recessions on the London market, rather than any continued lack of demand on this market. Consumers here were a bit reluctant to purchase at the high levels prevailing throughout the Fall, but the volume of sale was fairly satisfactory to the dealers. Since the last reduction in ammonium chloride the market has been holding steady and domestic manufacturers report a good sale at current levels shortly after the decline went into effect. Since then the market has been rather quiet. Producers of alcohol state that condition in the Metropolitan district have been a bit better due to an increase in the volume of anti-freeze business. The allotment of production ruling has not induced any influx of business, but it is a bit early to state just what effect this will have on market conditions. Copper sulfate while still occupying a very firm position, is not in such demand as was the case at the turn of the year. A good deal of the South American export business has been taken care of and the consuming demand is not so pressing. Producers are still unwilling to book orders ahead for more than sixty days. There has been no change in the price situation with the market ruling quite firm at the levels which have prevailed since January 1.

Alkali manufacturers, well satisfied with the volume of contract business done for the year, are principally occupied with work on the movement of these items. The amount of spot business being done in this line is negligible at the moment. The positions of the market in all cases is unchanged. One of the leading producers of calcium chloride reduced the price early in February. A new manufacturer entered the producing field for calcium chloride about the first of the year and there has been evidence of shading in price in some quarters as a result. This reduction by one of the old manufacturers is looked on as a move to meet this new competition to a certain extent. Tin salts are in none too strong a position and reductions, based on lower raw material costs, range from 1c to 1½c per pound over the month.

Animal Oils Weaker

In the oils and fats group, tallow, which was the outstanding item of strength at the time of the last report, has reached its peak and is now on the decline . The decline in price is attributed partially to a falling off in the buying by soap makers and also to a sympathetic movement with the Western market which has also eased off somewhat. In fact, the downward movement of practically the entire animal oil group has been a feature of the month in this group. Lard oil, neatsfoot oil, oleo oil, stearine oleo and choice white grease have all shared in this downward movement. The position in Chinawood oil has not shown any particular revision, and with conditions in China against any expedient shipments from that point, sellers on this market are holding for higher prices. Cottonseed oil has been quiet and easy during the period. This has been particularly true of crude oil which has declined ½c per pound during the month. The spot price of prime summer yellow oil has not been materially affected by the downward movement in crude oil, though it has reflected in futures, which have sold off somewhat. Linseed oil has shown signs of a better tone and the market has been advanced a bit, despite quiet conditions which have prevailed.

The movement in the fertilizer market has been varied, based on the activity of the individual items. Sulfate of ammonia has advanced during the month and the beginning of the usual seasonal inquiry is making itself felt. South American blood is also in a very firm position owing to an increase in the demand from fertilizer manufacturers, and the price has been advanced. While the local and Chicago market for ground tankage are quiet and tending toward easy, the South American market is firm, based on a heavy demand from Pacific Coast buyers. Nitrate of soda has shown a net decline of 10c per 100 pounds for the month and at this writing is rather quiet. While there is a usual volume of business in the South, the spot market is quiet, probably with consumers looking for further easier movements before placing business here.

The following letter from our Savannah correspondent is indicative of the naval stores position on that market:

Turpentine is firm at 55c per gallon. Present prices are not conducive to the purchase of much turpentine. There are supposed to be a small amount of holding lots on this market, awaiting higher prices. This period of the year is one which witnesses the smallest receipts. At the same time there are small receipts coming in all the time. Stocks at Savannah and other points are probably sufficient to hold the market steady and prevent it from going over 60 cents for the next six or eight weeks. Receipts of turpentine this week (February 4) were 671 bbls. sales reported 460 bbls.; shipments, 1,989 bbls, and stocks to-day, 21,176 bbls.

For many days prices of rosin have been going lower, and the present low prices should attract business and start the prices up again. Prices have been dropping due to the small demand. Offerings for sale this past week have been small, as is natural for this season of the year. Shipments have been heavy and stocks reduced materially. Stocks are, however, still considerably larger than at this time last year, due to the much larger crop. Receipts of rosin this week (February 4) were 4,446 bbls.; sales reported 3,102 bbls.; shipments 13,252 bbls. and stocks to-day 93,330 bbls.

Prices Current

Heavy Chemicals, Coaltar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Naval Stores, Fatty Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Imported chemicals are so designated. Resale stocks when a market factor are quoted in addition to makers' prices and indicated "second hands."

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Standard Purchasing Power of the Dollar: July 1914 $1.00 - Jan. 1927 68.7c - July 1927 71.7c - Jan. 1928 65.6c

Acetone — Following the advance of C. P. grade to 13c per lb. shortly after the first of the year there has been no change in the position. Sellers report an average demand for this season of the year, though the market has admittedly showed some slackening off since early in January.

Acid Acetic — The market is steady as to price with no particular change in the position over the month. Following the usual routine conditions following the annual contract season, the market has again regained a normal stride.

Acid Benzoic—Nothing in the way of price movement has developed in the past few weeks. The market is steady with a fairly good sale at 60c @ 62c lb. for U. S. P.

Acid Citric — Conditions have not shown any particular change over the period under report. Domestic producers continue to ask 44c @ 44½c lb. for crystal material according to quantity. Imported competition is not making itself felt to any extent. Powdered is likewise quiet and fractionally higher in price.

Acid Cresylic — Conditions on the local market continue quite firm and there has not been any tendency to reduce prices which are holding firm at 68c @ 70c gal. for dark and 72c @ 74c gal. for light.

Acid Gamma—Has not shown any particular change since last reported. Sellers still have strong ideas as to the market value. Deliveries on this years contracts is now well under way and the market is quoted at $1.00 @ $1.06 lb. as to quantity.

Acid Lactic — Leading producers have reduced the price rather sharply on this item and quotations are now at 4¼c @ 5¼c lb. for 22% dark; 10c @ 10½c lb. for 44%; 5⅛c @ 6¼c lb. for 22% light and 12c @ 12½c lb. for 44% dark.

Acid Formic —Unchanged since the first of the year. There is no particular demand for supplies from the New England mills and open quotations remain at 11c @ 12c lb.

1914 July	1927 High	1927 Low	1927 Aver.		Current Market	1928 High	1928 Low
.....	.24	.24	.24	Acetaldehyde, drs 1c-1 wks...lb.	.24	.26	.24
.....	.20	.20	.20	Acetanilid, tech, 150 lb bbl....lb.	.23	.24	.24
.....	.29	.29	.29	Acetic Anhydride, 92-95%, 100 lb cbys.....lb.	.29	.35	.35
.....	.38	.32	.37	Acetin, tech drums.....lb.			
.02½	.12	.12	.12	Acetone, CP, 700 lb drums c-1 wks.....lb.	.....	.13	.13
1918	1.65	1.65	1.65	Acetone Oil, drs NY.....gal.	1.65	1.75	1.75
.....	.42	.42	.42	Acetyl Chloride, 100 lb cby...lb.	.42	.45	.45
				Acids			
1.50	3.38	3.38	3.38	Acid Acetic, 28% 400 lb bbls c-1 wks.....100 lb.	.....	3.38	3.38
.....	11.92	11.92	11.92	Glacial, bbl c-1 wk...100 lb	.....	11.92	11.92
.....	.98	.98	.98	Anthranilic, refd, bbls.....lb.	.98	1.00	1.00
.....	.80	.80	.80	Technical, bbls.....lb.	.....	.80	.80
1.00	1.60	1.25	1.38	Battery, cbys.....100 lb.	1.60	2.25	2.25
.23	.57	.57	.57	Benzoic, tech, 100 lb bbls...lb.	.57	.60	.60
.07½	.08½	.08½	.08½	Boric, crys. powd, 250 lb bbls.....lb.	.08½	.11	.11
.....	1.25	1.25	1.25	Broenner's, bbls.....lb.	.....	1.25	1.25
1917	.85	.80	.84	Butyric, 100% basis cbys...lb.	.85	.90	.90
1917	4.90	4.85	4.89	Camphoric.....lb.	.....	4.85	4.85
.....	.25	.25	.25	Carbolic, 10%, 50 gal bbls..lb.	.25	.28	.28
.....	.15	.15	.15	Chlorosulfonic, 1500 lb drums wks.....lb.	.15	.16	.16
1918	.37	.25	.29	Chromic, 99%, drs extra...lb.	.25	.30	.30
.....	1 00	1.00	1.00	Chromotropic, 300 lb bbls..lb.	1.00	1.06	1.06
.53	.44½	.43	.43⅜	Citric, USP, crystals, 230 lb bbls.....lb.	.44	.55	.55
.....	.95	.95	.95	Cleve's, 250 lb bbls.....lb.	.95	.97	.97
1918	.60	.57	.61	Cresylic, 95%, dark drs NY.lb.	.68	.70	.70
1918	.70	.60	.63½	97-99%, pale drs NY....lb.	.72	.74	.74
1918	.11	.10	.10½	Formic, tech 85%, 140 lb cby.....lb.	.11	.12	.12
1918	.50	.50	.50	Gallic, tech, bbls.....lb.	.50	.55	.55
1918	.74	.69	.72	USP, bbls.....lb.	....	.74	.74
.....	1.00	1.00	1.00	Gamma, 225 lb bbls wks...lb.	1.00	1.06	1.06
1918	.57	.57	.57	H, 225 lb bbls wks.....lb.	.57	.63	.63
.....	.67	.65	.65½	Hydriodic,USP,10%soln cbylb.	...	.67	.67
.....	.45	.45	.45	Hydrobromic, 48%, coml, 155 lb cbys wks..... ...lb.	.45	.48	.48
.....	.80	.80	.80	Hydrochloric, CP, see Acid Muriatic..... Hydrocyanic, cylinders wks lb.	.80	.90	.90
.03	.06	.06	.06	Hydrofluoric, 30%, 400 lb bbls wks.....lb.	.....	.06	.06
.....	.11	.11	.11	Hydrofluosilicic, 35%, 400 lb bbls wks.....lb.	.....	.11	.11
.....	.85	.85	.85	Hypophosphorous, 30%, USP, demijohns.....lb.	.....	.85	.85
.019	.05½	05½	.05½	Lactic,22%,dark,500 lb bbls lb.	.04¾	.05¼	.06
.04	.13	.13	.13	44%, light, 500 lb bbls ...lb.	.12	.12½	.13½
.....	.52	.52	.52	Laurent's, 250 lb bbls.....lb.	.52	.54	.54
....	.60	.60	.60	Metanilic, 250 lb bbls.....lb.	.60	.65	.65
1918	.07¾	.07¾	.07¾	Mixed Sulfuric-Nitric..... drs wks.....N unit	.07¾	08	.08
1918	.01	.01	.01	drs wks.....S unit	.01	.01½	.01½
.....	.21	.18	.19½	Monochloroacetic, tech bbl.lb.	.18	.21	.21
.....	1.65	1.65	1.65	Monosulfonic, F Delta bbls.lb.	.....	.65	.65
1.15	1.35	1.35	1.35	Muriatic, 18 deg, 120 lb cbys c-1 wks.....100 lb.	.....	1.35	1.35
1.30	1.70	1.70	1.70	20 degrees, cbys wks..100 lb.	1.70	1.80	1.80
.....	.95	.95	.95	N & W, 250 lb bbls.....	.95	.95	.95
1918	.55	.55	.55	Naphthionic, tech, 250 lb .....lb.	.55	.59	.59
3.37½	5.00	5.00	5.00	Nitric, 36 deg, 135 lb cbys c-1 wks.....100 lb.	.....	5.00	5.00
4.50	6.00	6.00	6.00	40 deg, 135 lb cbys, c-1 wks.....100 lb.	.....	6.00	6.00
.07½	.11½	.11	.11	Oxalic, 300 lb bbls wks NY..lb.	.11	.11½	.11½
.036	.08	.07	.07½	Phosphoric 50%, 150 lb cby.lb.	.08	.08½	.08½
.23	.19	.16	.16¾	Syrupy, USP, 70 lb drs...lb.	.....	.16	.16
1918	.50	.50	.50	Picramic, 300 lb bbls.....lb.	.....	.50	.50
.50	.45	.30	.41½	Picric, kegs.....lb.	.40	.50	.50
.....	.86	.86	.86	Pyrogallic, technical, 200 lb bbls.....lb.	.....	.86	.86
.22½	.27	.27	.27	Salicylic, tech, 125 lb bbl...lb.	.27	.32	.32
1918	.15	.15	.15	Sulfanilic, 250 lb bbls.....lb.	.15	.16	.16
1.00	1.60	1.60	1.60	Sulfuric, 66 deg, 180 lb cbys 1c-1 wks.....100 lb.	1.60	1.95	1.95
1.00	1.20	1.20	1.20	1500 lb dr wks.....100 lb.	.....	1.20	1.20
.87½	1.10	1.10	1.10	60°, 1500 lb dr wks..100 lb.	.....	1.12½	1.12½
1.25	1.50	1.50	1.50	Oleum, 20%, 1500 lb drs 1c-1 wks.....100 lb.	.....	1.52½	1.52½
.....	42.00	42.00	42.00	40%, 1c-1 wks net.....ton	.....	42.00	42.00
.55	.30	.30	.30	Tannic, tech, 300 lb bbls...lb.	.30	.40	.40
.30½	.37	.29½	.32½	Tartaric, USP, crys, powd, 300 300 lb bbls.....lb.	.34½	.35	.35
.....	.85	.85	.85	Tobias, 250 lb bbls.....lb.	.....	.85	.85

Butyl Cellosolve and Brush Lacquers

BRUSH lacquers differ from automobile lacquers chiefly in their higher gum content and slower rate of drying.

These two conditions require considerable quantities of high boiling compounds that are good gum and nitrocotton solvents. To meet this need the Carbide and Carbon Chemicals Corporation now offers *Butyl Cellosolve*.

Butyl Cellosolve (Ethylene Glycol mono butyl ether) is an oily liquid of faint, but agreeable odor, boiling at 170° C. It is a powerful solvent for nitrocotton and an excellent solvent for gums and resins. Its dilution ratio for gasoline and petroleum is unusually high. These properties make it an ideal complement to Cellosolve in the manufacture of brushing lacquers.

Brush lacquers made with Cellosolve and Butyl Cellosolve are practically odorless. The rate of drying can be varied from one-half to two hours by regulating the proportions of the two solvents, but in either case the final film will possess high gloss due to the smooth and gradual deposition of gum and nitrocotton as the Butyl Cellosolve evaporates.

Neither Cellosolve nor Butyl Cellosolve contains ester groups. Hydrolysis and the development of acidity is therefore impossible in lacquers made with these solvents, thus eliminating all difficulty such as livering, geling and corrosion insofar as solvents are concerned.

CARBIDE AND CARBON CHEMICALS CORPORATION
Carbide and Carbon Building, 30 East 42nd Street, New York City

UCC

Unit of Union Carbide and Carbon Corporation

Prices Current and Comment

Standard Purchasing Power of the Dollar: July 1914 $1.00 - Jan. 1927 68.7c - July 1927 71.7c - Jan. 1928 65.6c

Acid Oxalic — American producers are still behind on their commitments and with no signs of imported competition effecting this market, this condition is expected to continue for some time yet. Sales are being made in the Metropolitan district at 11c @ 11¼c lb. as to quantity.

Acid Sulfuric— Since the advance in price of 60° degrees and oleum acid shortly before the close of 1927 there has not been any movement in any grade. At the end of January and early this month the market was rather routine, following a good movement over the turn of the year.

Albumen — The weakness in egg albumen which was beginning to be discernible when last reported here, has crystalized during the past month in the form of a 5c lb. reduction in the price of technical, which is now quoted at 75c lb. Demand for both this grade and edible remains slack. The outlook for edible vegetable albumen continues to be favorable and in brisk demand, although no price changes are reported. Prices on blood albumen also remain unchanged without much increase in demand.

Alcohol — The enforcement of the allotment of production measure has not brought about any great desire on consumers part to take on additional sticks. The position of the market has changed little, if any, since the early part of January. Producers claim to see better conditions existing in this district, where the market was weakest, but there is still quite some shading noticeable in a good many directions. The anti-freeze business has been a bit better, but on the whole the market cannot be characterized as any firmer than was the case last month.

Ammonia — Producers seem satisfied to busy themselves with deliveries on new contracts and with little spot demand the market is in rather a quiet position as to the volume of daily business being consumated. The price of anhydrous is holding quite firm and sellers are having no trouble in getting the full market price of 13½c @ 14c lb. on the sale that are being made. Aqua is likewise quiet at 3c @ 3¼c lb.

Ammonium Chloride — As a result of the reduction in price around the first of the year, domestic manufacturer noted a somewhat better demand during the early weeks of the year. However this demand has abated to a great extent and the market figure of $4.70 100 lbs., New York, interests is rather routine. Im-

1914 July	1927 High	1927 Low	1927 Aver.			Current Market	1928 High	1928 Low
.....	2.75	2.00	2.60	Trichloroacetic, bottles	lb.	.....	2.75	2.75	2.75
.....	2.00	2.00	2.00	Kegs	lb.	.....	2.00	2.00	2.00
.....	1.00	1.00	1.00	Tungstic, bbls	lb.	1.00	1.25	1.25	1.00
.19	.45	.45	.45	Albumen, blood, 225 lb bbls	lb.	.45	.55	.55	.45
.40	.95	.80	.87	Egg, edible	lb.	.....	.82	.82	.82
.....	.92	.77	.82	Technical, 100 lb drs	lb.	.....	.75	.80	.75
1918	.60	.60	.60	Vegetable, edible	lb.	.60	.65	.65	.60
.....	.50	.50	.50	Technical	lb.	.50	.55	.55	.50
.....	.20	.19	.19½	Alcohol Butyl, Normal, 50 gal drs c-l wks	lb.	.....	.20	.20	.20
.....	.20½	.19½	.19½	Drums, 1c-1 wks	lb.	.....	.19½	.19½	.19½
.....	.19½	.18½	.19	Tank cars wks	lb.	.....	.19	.19	.19
.....	.....	.....	.....	Amyl (from pentane) drs c-l wks	gal.	1.90	2.25	2.25	1.90
1.70	1.70	1.70	1.80	Diacetone, 50 gal drs del	gal.	1.70	1.80	1.80	1.70
2.50	3.70	3.70	3.70	Ethyl, USP, 190 pf, 50 gal bbls	gal.	.....	3.70	3.70	3.70
.....	.50	.50	.50	Anhydrous, drums	gal.	.50	.55	.55	.50
1918	.52	.37½	.46	Completely denatured, No. 1, 190 pf, 50 gal drs drums extra	gal.	.....	.52	.52	.52
1918	.50	.29	.42	No. 5, 188 pf, 50 gal drs. drums extra	gal.	.....	.50	.50	.50
.....	.46	.25	.40	Tank, cars	gal.	.....	.46	.46	.46
.....	1.00	1.00	1.00	Isopropyl, ref, gal drs	gal.	1.00	1.25	1.25	1.00
.....	1.00	1.00	1.00	Propyl Normal, 50 gal dr	gal.	.....	1.00	1.00	1.00
.....	.80	.80	.80	Aldehyde Ammonia, 100 gal dr lb		.80	.82	.82	.80
1918	.65	.65	.65	Alpha-Naphthol, crude, 300 lb bbls	lb.	.....	.65	.65	.65
1917	.35	.35	.35	Alpha-Naphthylamine, 350 lb bbls	lb.	.35	.37	.37	.35
1.75	3.25	3.15	3.08½	Alum Ammonia, lump, 400 lb bbls, 1c-1 wks	100 lb.	3.25	3.30	3.30	3.25
5.00	5.25	5.25	5.25	Chrome, 500 lb casks, wks	100 lb.	5.25	5.50	5.50	5.25
4.00	3.50	3.10	3.43	Potash, lump, 400 lb casks wks	100 lb.	3.10	3.20	3.20	3.10
5.00	5.25	5.25	5.25	Chrome, 500 lb casks wks	100 lb.	5.25	5.50	5.50	5.25
.....	3.75	3.75	3.75	Soda, ground, 400 lb bbls wks	100 lb.	.....	3.75	3.75	3.75
17.00	27.00	26.00	26.08	Aluminum Metal, c-1 NY	100 lb.	.....	26.00	26.00	26.00
.....	.35	.35	.35	Chloride Anhydrous, 275 lb drums	lb.	.35	.40	.40	.35
.12	.17	.17	.17	Hydrate, 96%, light, 90 lb bbls	lb.	.17	.18	.18	.17
.....	.23	.23	.23	Stearate, 100 lb bbls	lb.	.23	.24	.24	.23
1.25	1.75	1.75	1.75	Sulfate, Iron, free, bags c-l wks	100 lb.	.....	1.75	1.75	1.75
.87½	1.40	1.35	1.35½	Coml, bags c-l wks	100 lb.	.....	1.40	1.40	1.40
.....	1.15	1.15	1.15	Aminoazobenzene, 110 lb kegs	lb.	.....	1.15	1.15	1.15
				Ammonium					
.25	.13½	.10	.10½	Ammonia, anhyd, 100 lb cyl	lb.	.....	.13½	.13½	.13½
.04½	.03	.02½	.03	Water, 26°, 800 lb dr del	lb.	.....	.03	.03	.03
.....	.21	.21	.21	Bifluoride, 300 lb bbls	lb.	.21	.22	.22	.21
.08	.08½	.08½	.08½	Carbonate, tech, 500 lb cs	lb.	.08½	.09	.09	.08½
6.25	5.05	4.85	5.00	Chloride, White, 100 lb bbls wks	100 lb	4.70	5.15	5.15	4.70
.05½	.07	.05½	.06	Gray, 250 lb bbls wks	lb	5.40	5.75	5.75	5.40
.10	.11	.11	.11	Lump, 500 lb cks spot	lb.	.11	.11½	.11½	.11
.....	.15	.15	.15	Lactate, 500 lb bbls	lb.	.15	.16	.16	.15
.15	.06	.06	.06	Nitrate, tech, casks	lb.	.06	.10	.10	.06
.....	.27½	.27½	.27½	Persulfate, 112 lb kegs	lb.	.27½	.30	.30	.27½
.....	.18	.18	.18	Phosphate, tech, powd, 325 lb bbls	lb.	.....	.18	.18	.18
2.60	2.30	2.55	2.41	Sulfate, bulk c-1	100 lb.	.....	2.45	2.45	2.40
2.60	2.55	2.35	2.42	Southern points	100 lb.	.....	2.55	2.55	2.55
.....	59.70	56.85	57.56	Nitrate, 26% nitrogen 31.6% ammonia imported bags	ton	.....	60.85	60.85	60.85
.....	.55	.55	.55	Sulfocyanide, kegs	lb.	.55	.60	.60	.55
1.55	2.25	1.90	2.10½	Amyl Acetate, (from pentane) drs	gal.	1.90	2.25	2.25	1.90
				Alcohol, see Fusel Oil					
.10½	.15½	.15	.15	Aniline Oil, 960 lb drs	lb.	.15½	.16½	.16½	.15½
.32	.41	.41	.41	Annatto, fine	lb.	.41	.48	.48	.41
.....	.90	.90	.90	Anthraquinone, sublimed, 125 lb bbls	lb.	.90	1.00	1.00	.90
.....	.11½	.14	.12	Antimony, metal slabs, ton lots	lb.	.....	.09½	.11½	.09½
.03½	.15½	.14	.15	Needle, powd, 100 lb cs	lb.	.15½	.16	.16	.15½
1918	.17	.17	.17	Chloride, soln (butter of)	cbys.	.17	.18	.18	.17
.06	.16½	.16½	.16½	Oxide, 500 lb bbls	lb.	.16½	.17	.17	.16½
.11½	.28	.25½	.26½	Salt, 66%, tins	lb.				
.18	.20	.16	.17½	Sulfuret, golden, bbls	lb.	.16	.20	.20	.16
.15	.42	.37½	.38	Vermilion, bbls	lb.	.38	.42	.42	.38
.14	.18	.18	.18	Archil, conc, 600 lb bbls	lb.	.....	.12	.12	.12
.08	.12	.12	.12	Double, 600 lb bbls	lb.	.14	.15	.15	.14
.....	.16	.14	.15	Triple, 600 lb bbls	lb.	.16	.18	.18	.16
.....	.15	.12½	.13½	Argols, 80%, casks	lb.	.....	.08	.08	.08
.....	.08	.03	.06½	Coude, 30%, casks	lb.	.15	.16	.16	.15
.05½	.10½	.10½	.10½	Arsenic, Red, 224 lb kegs, cs	lb.	.10½	.11	.11	.10½
.03	.04	.03½	.04	White, 112 lb kegs	lb.	.03½	.04	.04	.03½
.....	14.75	14.75	14.75	Asbestine, c-1 wks	ton	.....	14.75	14.75	14.75
.....	47.50	47.50	47.50	Barium, Carbonate, 200 lb bags wks	ton	47.00	50.00	50.00	47.00
.13	.12	.12	.12	Chlorate, 112 lb kegs NY	lb.	.12	.12½	.12½	.12
30.00	65.00	57.50	60.70	Chloride, 800 lb bbl wks	ton	55.50	60.00	60.00	55.50
1916	.13	.13	.13	Dioxide, 88%, 690 lb drs	lb.	.13	.13½	.13½	.13
.....	.04½	.04½	.04½	Hydrate, 500 lb bbls	lb.	.04	.04½	.04½	.04½
.05½	.07½	.07½	.07½	Nitrate, 700 lb casks	lb.	.07½	.08	.08	.07½
17.00	23.00	23.00	23.00	Barytes, Floated, 350 lb bbls wks	ton	23.00	24.00	24.00	23.00
.....	.....	.....	.....	Bauxite, bulk, mines	ton	5.00	8.00	8.00	5.00
.39	.40	.37	.39	Beeswax, Yellow, crude bags	lb.	.37	.38	.38	.37
.40	.46	.38	.43	Refined, cases	lb.	.42	.43	.43	.42

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BARIUM CHLORIDE

BARIUM SULPHIDE
(BLACK ASH)

Samples on Request.

SODIUM SULPHIDE
30°-32° CRYSTALS

IRON OXIDE
(VENETIAN RED)

Samples on Request.

BACKED in Gum-Wood Barrels Paraffine Lined

SODIUM SULPHIDE

(30°-32° CRYSTALS)

Alton Barium Products Co., Alton, Ill.

ALTON PRODUCTS

Prices Current and Comment

Standard Purchasing Power of the Dollar: July 1914 $1.00 - Jan. 1927 68.7c - July 1927 71.7c - Jan. 1928 65.6c

porters will now meet these price levels, though they are not faring any better as to sales.

Ammonium Sulfate — The expected price advance alluded to last month has materialized in a 5c lb. advance with the market still in strong position. The usual seasonal demand is beginning to make itself felt and the southern resale market is quite active.

Aniline Oil—Demand during January has been quite brisk and producers are holding the market steady naming 15c lb. in tank cars and 15¾c @ 16c lb. in drums.

Antimony — During the closing days of January there was a noticeable improvement in the volume of sale. The spot market has a firmer tone and quotations were heard last week at 9⅜c lb. f. o. b. New York, for material to arrive. Spot quotations were generally held firm at 9¼c lb. Stocks are reported as none too plentiful at these levels.

Arsenic — Little is heard of any activity, though sellers claim to be getting about 4c lb. for business being consummated at the moment. The market is about as usual this season of the year.

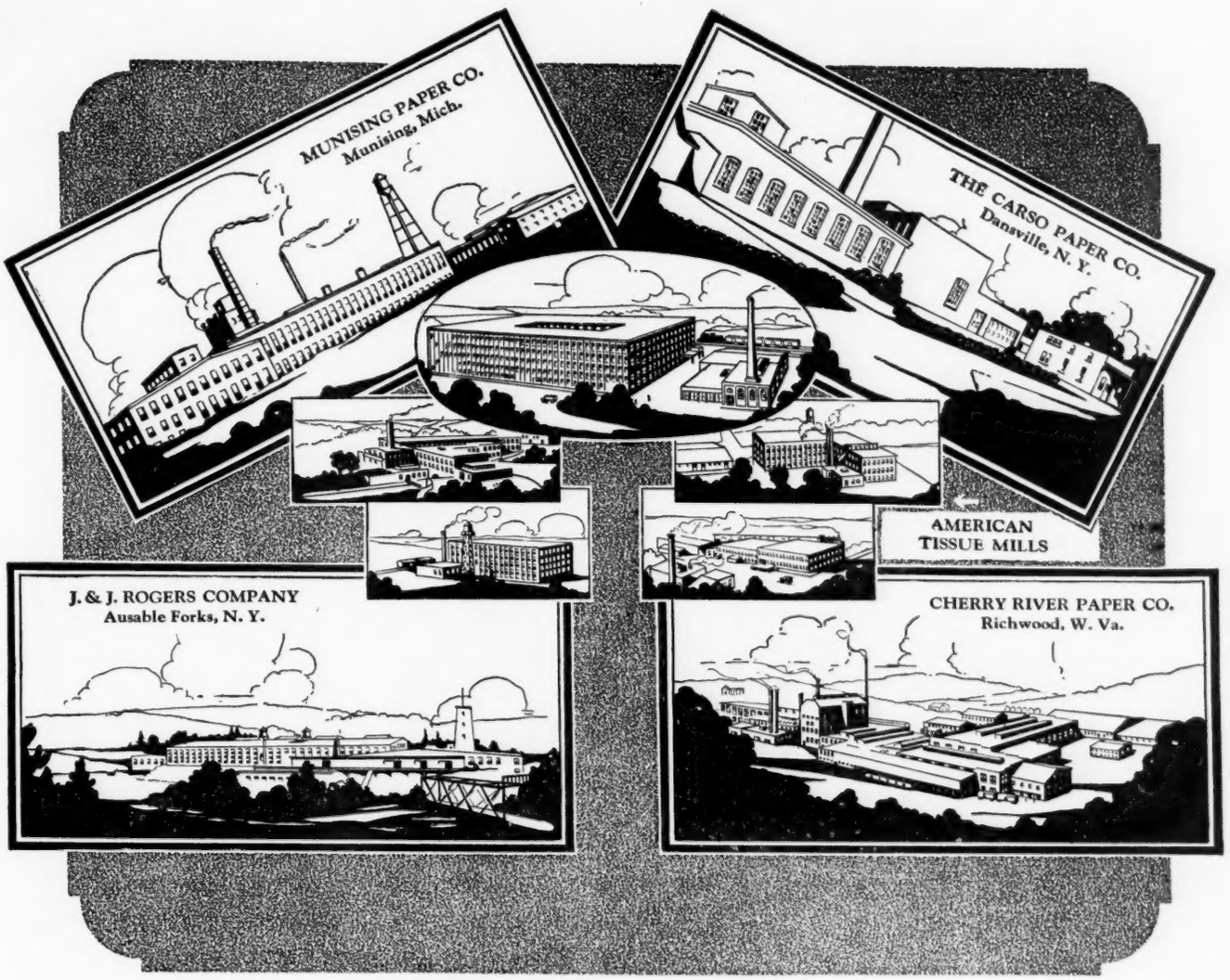
Barium Chloride — The demand for both domestic and imported material has fallen off during the past few weeks and the market can be characterized as routine. Domestic makers continue to name their schedule price as the market level, but imported is offered somewhat below these levels.

Bees Wax — Increased demand for white wax when last reported proved to be only a temporary one and was soon followed by a decline in price to 55c @ 56c lb. Both grades of yellow continue unchanged with crude at 37c @ 38c lb. and refined at 42c @ 43c lb.

Beta Naphthol—This market has been devoid of features since the close of the contract season. Interest centers on the delivery of these contracts. The market is held at 22c @ 24c lb. as to seller and grade.

Benzene—At the close of January business was rather quiet in this territory, though leading sellers maintain that there is no shading of the quoted levels of 21c @23c gal. It is now an admitted fact that the 21c level is being done on sales of tanks with little success in getting the higher level. For the drum lots the price is held at 26c gal. The output of benzol is still below normal, though the ovens are gradually resuming operations.

1914 July	1927 High	1927 Low	1927 Aver.		Current Market	1928 High	1928 Low
.47½	.58	.56	.57½	White, cases....lb.	.56	.58	.58	.56
.....	.65	.65	.65	Benzaldehyde, technical, 945 lb drums wks....lb.	.65	.70	.70	.65
.....	.23	.21	.22	Benzene, 90%, Commercial, 8000 gal tanks wks....gal.	.21	.23	.23	.21
.....	.23	.21	.22½	CP, tanks works....gal.	.21	.23	.23	.21
.....	.70	.70	.70	Benzidine Base, dry, 250 lb bbls....lb.	.70	.74	.74	.70
.....	1.00	1.00	1.00	Benzoyl, Chloride, 500 lb drs..lb.	.....	1.00	1.00	1.00
.....	.....	.....	.....	Benzyl, Chloride, tech drs....lb.	.....	.25	.25	.25
.....	.24	.24	.24	Beta-Naphthol, 250 lb bbl wk..lb	.24	.26	.26	.24
.....	1.35	1.35	1.35	Naphthylamine, sublimed, 200 lb bbls....lb.	.....	1.35	1.35	1.35
.....	.63	.63	.63	Tech, 200 lb bbls....lb.	.63	.65	.65	.63
75.00	80.00	80.00	80.00	Blanc Fixe, 400 lb bbls wks...ton	80.00	90.00	90.00	80.00
1.20	2.25	2.00	2.23	Bleaching Powder, 300 lb drs c-1 wks contract....100 lb.	.....	2.2[illegible]	2.25	2.25
.....	2.25	2.00	2.02	700 lb drs c-1 wks contract ....100 lb.	.....	2.00	2.00	2.00
3.00	3.75	4.75	4.47½	Blood, Dried, FOB, NY..Unit	.....	5.10	5.25	5.10
.....	.....	.....	.....	Chicago....Unit	.....	5.00	5.00	5.00
.....	.....	.....	.....	S. American shipt....Unit	.....	5.00	5.00	4.95
.27	.30	.28	.29	Blues, Bronze Chinese Milori Prussian Soluble....lb.	.28	.30	.30	.28
28.50	38.00	29.00	29.04	Bone, raw, Chicago....ton	29.00	30.00	30.00	29.00
.....	.06	.06	.06	Bone, Ash, 100 lb kegs....lb.	.06	.07	.07	.06
.02½	.08½	.08½	.06	Black, 200 lb bbls....lb.	.....	.08½	.08½	.08½
20.00	30.00	28.00	29.46	Meal, 3% & 50%, Imp....ton	32.00	37.00	37.00	32.00
.04	.04½	.04½	.04½	Borax, crys, 500 lb bbls....lb.	.03¾	.04¼	.05	.03¾
.07	.11	.11	.11	Bordeaux, Mixture, 16% pwd.lb.	.11	.12	.12	.11
.03½	.08	.08	.08	Paste, bbls....lb.	.08	.10	.10	.08
55.00	28.00	26.00	27.30	Brazilwood, sticks, shpmt....lb.	26.00	28.00	28.00	26.00
1918	.60	.60	.60	Bronze, Aluminum, powd blk.lb.	.60	1.20	1.20	.60
.....	.55	.55	.55	Gold, bulk....lb.	.55	1.25	1.25	.55
.....	1.60	1.42	1.52	Butyl, Acetate, normal drs 1c-1 wks....gal.	.....	1.60	1.60	1.60
.....	1.55	1.42	1.47½	Tank, drs wks....gal.	.....	1.55	1.55	1.55
.....	1.00	1.00	1.00	Secondary, 50 gal drs....gal.	1.00	1.05	1.05	1.00
.....	.70	.70	.70	Aldehyde, 50 gal drs wks...lb.	.....	.70	.70	.70
.....	.34	.34	.34	Propionate, drs....lb.	.34	.36	.36	.34
.....	.60	.60	.60	Stearate, 50 gal drs....lb.	.....	.60	.60	.60
.....	.57	.57	.57	Tartrate, drs....lb.	.57	.60	.60	.57
1918	1.50	1.35	1.42	Cadmium, Sulfide, boxes....lb.	1.35	2.00	2.00	1.35
				Calcium				
.....	3.50	3.50	3.50	Calcium, Acetate, 150 lb bags c-1....100 lb.	.....	3.50	3.50	3.50
.....	.07½	.07½	.07½	Arsenate, 100 lb bbls c-1 wks....lb.	.07½	.08	.08	.07½
.....	.05	.05	.05	Carbide, drs....lb.	.05	.06	.06	.05
.....	1.00	1.00	1.00	Carbonate, tech, 100 lb bags c-1....lb.	1.00	1.00	1.00	1.00
1918	27.00	27.00	27.00	Chloride, Flake, 375 lb drs c-1 wks....ton	.....	26.00	27.00	26.00
12.00	21.00	21.00	21.00	Solid, 650 lb drs c-1 fob wks ....ton	20.00	22.00	23.00	20.00
.....	52.00	52.00	52.00	Nitrate, 220 lb bbls c-1 NY.ton	.....	52.00	52.00	52.00
.....	.09	.09	.09	Phosphate, tech, 450 lb bbls.lb.	.07	.08	.08	.07
.42½	.72	.62	.68	Camphor, American, refined 250 lb bbls....lb.	.....	.62	.62	.62
.44½	.69	.60	.66	Japanese, ref, slabs, 100 lb cases....lb.	.60	.61	.61	.60
.....	.....	.....	.....	Camwood, Bark, ground bbls.lb.	.....	.18	.18	.18
.22	.33	.33	.30½	Candelilla Wax, bags....lb.	.26	.27	.28	.26
.....	.08	.08	.08	Carbon, Decolorizing, 40 lb bags c-1....lb.	.08	.15	.15	.08
.....	.12	.12	.12	Black, 100-300 lb cases 1c-1 NY....lb.	.....	.12	.12	.12
.06½	.05½	.05½	.05½	Bisulfide, 500 lb drs 1c-1 NY....lb.	.05½	.06	.06	.05½
.....	.06	.06	.06	Dioxide, Liq, 20-25 lb cyl..lb.	.....	.06	.06	.06
.07½	.07	.07	.07	Tetrachloride, 1400 lb drs delivered....lb.	.07	.07½	.07½	.07
.50	.50	.50	.50	Carnauba Wax, Flor, bags....lb.	.....	Nom.	.50	.50
.....	.90	.54	.60½	No. 1 Yellow, bags....lb.	.56	.57	.60	.56
.32	.37	.24	.31	No. 2 N Country, bags....lb.	.35	.37	.38	.35
.42½	.68	.48	.56	No. 2 Regular, bags....lb.	.53	.54	.56	.53
.....	.18½	.15½	.17	Casein, Standard, ground....lb.	.17	.17½	.18½	.17
.....	.34	.26	.32¾	Celluloid, Scraps, Ivory cs....lb.	.26	.30	.30	.26
.....	.18	.18	.18	Shell, cases....lb.	.18	.20	.20	.18
.....	.34	.26	.32¾	Transparent, cases....lb.	.30	.32	.32	.30
.....	1.40	1.40	1.40	Cellulose, Acetate, 50 lb kegs..lb.	.....	1.40	1.40	1.40
.....	.03	.03	.03	Chalk, dropped, 175 lb bbls...lb.	.03	.03½	.03½	.03
.03	.02½	.02½	.02½	Precip, heavy, 560 lb cks...lb.	.....	.04½	.04½	.04½
.04	.04½	.04½	.04½	Light, 250 lb casks....lb.	.02½	.03½	.03½	.02½
.....	.18	.18	.18	Charcoal, Hardwood, lump, bulk wks....lb.	.18	.19	.19	.18
1918	.06	.06	.06	Willow, powd, 100 lb bbl wks....lb.	.06	.06½	.06½	.06
.....	.04	.04	.04	Wood, powd, 100 lb bbls....lb.	.04	.05	.05	.04
.....	.03	.02½	.03	Chestnut, clarified bbls wks,..lb.	.02½	.03	.03	.02½
.04	.02	.01½	.02	25% tks wks....lb.	.....	.02	.02	.02
.....	.05½	.05½	.05½	Powd, 60%, 100 lb bgs wks.lb.	.....	.04 4/5	04 4/5	.04 4/5
.....	.06½	.06½	.06½	Powd, decolorized bgs wks..lb.	.05½	.06	.06	.05½
8.00	8.00	8.00	8.00	China Clay, lump, blk mines.ton	8.00	9.00	9.00	8.00
.....	.01½	.01½	.01½	Powdered, bbls....lb.	.01½	.02	.02	.01½
.....	10.00	10.00	10.00	Pulverized, bbls wks....ton	10.00	12.00	12.00	10.00
14.00	15.00	15.00	15.00	Imported, lump, bulk. ton	15.00	25.00	25.00	15.00
.....	.03	.03	.03	Powdered, bbls....lb	.03	.03½	.03½	.03
1918	.08	.08	.08	Chlorine, cyls 1c-1 wks contract ....lb.	.08	.09	.09	.08
1917	.05½	.04	.04	Liq tank or multi-car lot cyls wks contract....lb.	.....	.03½	.03½	.03½
1918	.07	.07	.07	Chlorobenzene, Mono, 100 lb. drs 1c-1 wks....lb.	.....	.07	.07	.07
.19	.20	.20	.20	Chloroform, tech, 1000 lb drs..lb.	.20	.22	.22	.20



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Prices Current and Comment

Standard Purchasing Power of the Dollar: July 1914 $1.00 - Jan. 1927 68.7c - July 1927 71.7c - Jan. 1928 65.6c

Bleaching Powder — Since the closing of the contract season, the spot inquiry has been routine. This is a normal condition for this period of the year and sellers are holding to the openly quoted levels of $2.00 @ $2.25 per 100 lbs.

Blood — Continued activity among the stock feeding interests combined with the first evidences of a heavy fertilizer demand, has placed this commodity in a very strong position in South America. This has been reflected in an advance there to $5.00 a unit. Prices of $5.00 unit are being quoted at Chicago while the New York market is at $5.10 with little interest being shown.

Bone Meal — Demand from feeding interests continues good and prices are steady, with but small stocks available at first hand. Remains at $32.00 @ $37.00 ton.

Borax — Sales are being made at an ordinary gait and the market is holding steady at the moment at 3¾c @ 4¼c lb. as to seller and quantity. Reports are heard of cheaper prices for borax a bit later on due to an expected cheaper cost of production. Consuming interest in the market is fair.

Calcium Arsenate — It is too early as yet to report any noticeable activity. With the bulk of the consumption based on the extent of the boll weevil ravages, nothing the way of a better consuming demand is looked for until the Spring when some Southern dealers may buy for replacement in anticipation of a good movement this summer.

Calcium Chloride — Owing to the competition of a new factor in the market and a consequent shading of the established price by this factor, another maker has reduced the carlot price $1.00 ton to $20.00 ton f. o. b. works. Demand for calcium chloride is none too brisk at the moment and there is some competition for what business there is available.

Candelilla Wax — Further falling off in demand has occasioned lower prices, a decline of 1c lb. having occurred during the past month. It is now quoted at 26c @ 27c lb.

Carnauba Wax — Despite reported strong positions of primary markets, local conditions and lack of demand have caused a further falling off of the market here. Prices on Flor are purely nominal, there being no stocks available, but No. 1 Yellow has declined to 56c @ 57c lb.; No. 2 North Country to 35c @ 37c lb. and

1914 July	1927 High	1927 Low	1927 Aver.		Current Market		1928 High	1928 Low
....	1.00	1.00	1.00	Chloropicrin, commercial, cyls....lb.	1.00	1.35	1.35	1.00
.17	.27	.26	.26½	Chrome, Green, CP.....lb.	.26	.29	.29	.26
.03½	.06½	.06½	.06½	Commercial.....lb.	.06½	.11	.11	.06½
.11	.17½	.16½	.16¾	Yellow.....lb.	.16½	.17	.17	.16½
				Chromium, Acetate, 8% Chrome bbls.....lb.	.04¼	.05½	.05½	.04½
....	.05	.04½	.04½	20° soln, 400 lb bbls.....lb.	.....	.05½	.05½	.05½
1918	.05½	.05½	.05½	Fluoride, powd, 400 lb bbl..lb.	.27	.28	.28	.27
.....	.27	.27	.27	Oxide, green, bbls.....lb	.34½	.35½	.35½	.34½
.....	.34½	.34½	.34½	Coal tar, bbls.....bbl	9.00	9.50	9.50	9.00
.....	9.50	9.00	9.08	Cobalt Oxide, black, bags....lb.	2.10	2.22	2.22	2.10
1.00	2.10	2.10	2.10	Cochineal, gray or black bag..lb.	.84	.87	.87	.84
.48	.92	.77	.85½	Teneriffe silver, bags.....lb.	.....	.86	.86	.86
.42	.92	.77	.87½	Copper, metal, electrol...100 lb.	12.90	13.00	13.00	12.90
13.75	13.57½	12.90	12.97	Carbonate, 400 lb bbls.....lb.	.16½	.17½	.17½	.16½
.13½	.16¾	.16¼	.16½	Chloride, 250 lb bbls.....lb.	.....	.28	.28	.28
.....	.28	.28	.28	Cyanide, 100 lb drs.....lb.	.48	.50	.50	.48
.....	.48	.48	.48	Oxide, red, 100 lb bbls.....lb.	.16½	.17	.17	.16½
.....	.16½	.16½	.16½	Sub-acetate verdigris, 400 lb bbls.....lb.	.18	.19	.19	.18
.28	.18	.17	.18	Sulfate, bbls c-1 wks...100 lb.	5.05	5.10	5.10	5.05
4.00	5.00	4.75	4.91¼	Copperas, crys & sugar bulk c-1 wks.....ton	13.00	14.00	14.00	13.00
13.00	17.00	13.00	13.33½	Sugar, 100 lb bbls.....100 lb.	1.25	1.35	1.35	1.25
.....	1.25	1.25	1.25	Cotton, Soluble, wet, 100 lb bbls.....lb.	.40	.42	.42	.40
.80	.40	.40	.40	Cottonseed, S.E. bulk c-1...ton	.....	.....	.....	.....
.....	42.00	20.00	33.75	Meal S.E. bulk.....ton	.....	.....	.....	.....
.....	42.00	20.00	29.85	7% Amm., bags mills...ton	36.00	37.00	37.00	36.00
26.50	35.00	21.50	30.38	Cream Tartar, USP, 300 lb. bbls.....lb.	.26	.27½	.27½	.26
.23½	.27	.22	.24	Creosote, USP, 42 lb cbys.....lb.	.40	.42	.42	.40
.53	.40	.40	.40	Oil, Natural, 50 gal drs....gal.	.17	.19	.19	.17
1918	.20	.20	.20	10-15% tar acid.....gal.	.21	.23	.23	.21
1918	.25	.25	.25	25-30% tar acid.....gal.				
1918	.17½	.17½	.17½	Cresol, USP, drums.....lb.	.25	.28	.28	.25
.07½	.17	.16	.16½	Cudbear, English.....lb.	.17½	.20	.20	.17½
.05	.18½	.15	.18	Cutch, Rangoon, 100 lb bales.lb.	.16	.17	.17	.16
.....	.05	.05½	.05½	Borneo, Solid, 100 lb bale...lb.	.....	.18½	.18½	.18½
.....	1.82½	1.67½	1.78¾	Cyanamide, bulk c-1 wks Amm. .....lb.	.06	.07	.07	.06
.....	3.92	3.77	3.84½	Dextrin, corn, canary....100 lb.	.....	1.67½	1.67½	1.67½
3.00	3.87	3.72	3.78½	White, 140 lb bgs c-1....100 lb.	.....	3.77	3.77	3.77
.05½	.08½	.08½	.08½	Potato, yellow, 220 lb bgs...lb.	.....	3.72	3.72	3.72
.05½	.08½	.08½	.08½	White, 220 lb bags 1c-1....lb	.....	.08½	.08½	.08½
.....	.08¼	.08	.08	Tapioca, 200 lb bags 1c-1...lb	.....	.08½	.08½	.08½
.....	3.80	3.80	3.80	Diaminophenol, 100 lb kegs...lb	.08	.08¼	.08¼	.08
.....	2.95	2.85	2.93½	Diamylphthalate, drs wks...gal.	.....	3.80	3.80	3.80
.....	3.25	3.25	3.25	Dianisidine, 100 lb kegs.....lb.	2.85	2.90	2.90	2.85
.....	.31½	.29½	.30½	Dibutylphthalate, wks.....lb.	.....	2.80	2.80	2.80
.....	.55	.55	.55	Dibutyltartrate, 50 gal drs....lb.	.29½	.31½	.31½	.29½
.....	.23	.23	.23	Dichloromethane, drs wks....lb.	.55	.65	.65	.55
.....	2.15	2.15	2.15	Diethylamine, 400 lb drs.....lb.	.23	.25	.25	.23
.....	1.85	1.85	1.85	Diethyl carbonate, drs.....gal.	.....	2.15	2.15	2.15
1918	.55	.55	.55	Diethylaniline, 850 lb drs.....lb.	1.85	2.00	2.00	1.85
.....	.20	.20	.20	Diethyleneglycol, drs.....lb.	.55	.60	.60	.55
.....	.....	.....	.....	Mono ethyl ether, drs....lb	.10	.12	.12	.10
.....	.....	.....	.....	Mono butyl ether, drs....lb.	.25	.35	.35	.25
.....	.64	.64	.64	Diethylorthotoluidin, drs.....lb.	.64	.67	.67	.64
.....	.25	.25	.25	Diethyl phthalate, 1000 lb drums.....lb.	.24	.26	.26	.24
.....	.30	.20	.25	Diethylsulfate, technical, 50 gal drums.....lb.	.30	.35	.35	.30
.....	2.60	2.60	2.60	Dimethylamine, 400 lb drs....lb.	.....	2.62	2.62	2.62
1918	.32	.30	.31½	Dimethylaniline, 340 lb drs...lb.	.30	.32	.32	.30
.....	.45	.45	.45	Dimethylsulfate, 100 lb drs...lb.	.45	.50	.50	.45
1918	.15½	.15	.15½	Dinitrobenzene, 400 lb bbls...lb.	.15½	.16½	.16½	.15½
.....	.18	.18	.18	Dinitrochlorine, 300 lb bbl....lb.	.18	.19	.19	.18
1918	.15	.15	.15	Dinitrochlorobenzene, 400 lb. bbls.....lb.	.15	.16	.16	.15
1917	.32	.32	.32	Dinitronaphthalene, 350 lb bbls .....lb.	.32	.34	.34	.32
1918	.31	.31	.31	Dinitrophenol, 350 lb bbls....lb.	.31	.32	.32	.31
1918	.18	.15	.17½	Dinitrotoluene, 300 lb bbls....lb.	.18	.19	.19	.18
.....	1.05	.85	.88	Diorthotolyguanidine, 275 lb bbls wks.....lb.	.85	.90	.90	.85
1918	.48	.45	.45½	Diphenylamine.....lb.	.45	.47	.47	.45
.....	.....	.....	.....	Diphenylguanidine, 100 lb bbl.lb.	.68	.72	.72	.68
.....	.26	.26	.26	Dip Oil, 25%, drums.....lb.	.26	.30	.30	.26
45.00	49.00	41.00	45.25	Divi Divi pods, bgs shipmt....lb.	.....	Nom.	Nom.	Nom.
.02½	.04	.04	.04	Extract.....lb.	.....	Nom.	Nom.	Nom.
1918	.84	.72	.67½	Egg Yolk, 200 lb cases.....lb.	.76	.77	.77	.76
1.00	2.00	1.75	1.87½	Epsom Salt, tech, 300 lb bbls c-1 NY.....100 lb.	.....	1.75	1.75	1.75
.22	.45	.37	.43	Esther, USP, 1880, 50 lb drs..lb.	.37	.38	.38	.37
.....	.90	.90	.90	Ethyl Acetate, 85% Ester, 110 gal drs.....gal.	.....	.75	.80	.75
.....	1.10	1.03	1.08	99%, gal drums.....gal.	.....	1.10	1.10	1.10
.....	1.05	1.05	1.05	Benzylaniline, 300 lb drs...lb.	1.05	1.11	1.11	1.05
.....	.50	.50	.50	Bromide, tech, drums.....lb.	.....	.70	.70	.70
.....	.22	.22	.22	Chloride, 200 lb. drums....lb.	.....	.22	.22	.22
.....	3.50	3.50	3.50	Lactate, drums works.....gal.	.....	3.50	3.50	3.50
1918	.30	.30	.30	Methyl Ketone, 50 gal drs..lb.	.....	.30	.30	.30
.....	.45	.45	.45	Oxalate, drums works.....lb.	.45	.55	.55	.45
.....	.70	.70	.70	Ethylene Bromide, 600 lb dr..lb.	.....	.70	.70	.70
.....	.75	.75	.75	Chlorhydrin, anhydrous, 50 gal drums.....lb.	.75	.85	.85	.75
.....	.15	.11	.11½	Dichloride, 50 gal drums...lb.	.....	.11	.11	.11
.....	.30	.30	.30	Glycol, 50 gal drs wks.....lb.	.30	.40	.40	.30
.....	.30	.30	.30	Ethyl Ether, 50 gal drs 1c-1 wks.....gal.	.....	1.79	1.79	1.79
1918	.62	.62	.62	Ethylidenaniline.....lb.	.62	.65	.65	.62
8.00	20.00	20.00	20.00	Feldspar, bulk.....ton	20.00	25.00	25.00	20.00
.....	15.00	15.00	15.00	Powdered, bulk works.....ton	15.00	21.00	21.00	15.00
.....	.07½	.07½	.07½	Ferric Chloride, tech, crystals 475 lb bbls.....lb.	..07½	.09	.09	.07½
.....	.....	.....	.....	Ferrous Chloride, tech, crystals 475 lb bbls.....lb.	.05	.06	.06	.05

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News Notes

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1816 FEBRUARY, 1928 1928

CHEMICAL BUSINESS STEADY

January, 1928, has suffered in no way by comparison with January, 1927, and while the new year has not displayed as yet any particularly strengthening increase in the volume of trade as a whole, nevertheless, the market is in good shape with a strong undertone. Continually we note the failing tendency of "hand to mouth" buying. Throughout the contract season of last autumn and since then the character of our orders, booked and shipped, bears out this contention. There is a continually greater tendency on the part of wise buyers to cover ahead, a plain indication to us of greater confidence in the trend of business and the increasing belief that the chemical markets are not going to show materially lower prices.

Formic Acid—85-90%—Shipments are arriving at fairly frequent intervals and stocks are available in our numerous warehouses for quick shipment. Inquiry is fairly active and prices are well maintained.

Oxalic Acid—The demand is very good for this time of the year, with supplies plentiful. A slightly easier tone is noted in the domestic grade, whereas the imported, on the contrary, is, if anything, higher than heretofore.

Sal Ammoniac—The demand for this is not equal to the supply, with the domestic product somewhat easier. The imported grade, however, still commands considerable attention.

Barium Carbonate—Recent reductions in the price of the imported have brought about better demand. Buyers are showing more interest in this, owing to a possible increase in the tariff.

Naphthalene Flakes—With Spring in the offing, the consumers are showing more interest and indications are that a good demand will be experienced shortly, in view of the attractive prices, at which the product is offered.

Sodium Acetate—This product is in very brisk demand, with supplies extremely limited. Market advances have taken place as a result.

100 YEARS AGO

On March 7th, 1828, John Quincy Adams, President of the United States, submitted to the Senate, terms of a Treaty between the United States and the Chippewa, Menomonic and Winnebago Indian tribes, respecting property rights of the Indians—many of these Indians resided in New York State.

Treaties of amity, commerce and navigation between the United States and Prussia was negotiated with the State of Prussia and some other countries of Europe.

Great Britain with her vast Merchant Marine and manufacturing interests, was in position to dictate rather severe terms of trade with us, which became modified later, to give us better position in the world markets.

This company had been in business twelve years, and was coming into prominence as a source of Chemicals and Dyestuffs for the industries. Aaron Innis, one of the founders and a partner of Gifford Sherman and Innis, conducted a freight service on the Hudson. The products of our Poughkeepsie plant were shipped to New York and other points along the Hudson, in his own River transportation Company vessels.

Chicago office 722-24 West Austin Ave., situated a few blocks from the "Loop," it is close to action—yet removed from the traffic "jam". Convenient for shipment and spot stock delivery. The warehouse stocks are quickly accessible to our Chicago customers.

100 Years Ago—*Continued*

The Empire of Russia was at war with the Ottoman Porte (Turkey) over trade disputes.

President Adams proclaimed removal of discrimatory custom tariff against produce of the Kingdom of Hannover brought to our shores on Hanoverian vessels. This was done under Congressional Tariff Act of 1824 because of reciprocal removal of previous discrimination against American produce and shipping.

EDITORIALS

Every American chemical producer, big and little, has his own cards and apparently we are going to have an opportunity to play all of our trumps in a good stiff game in which the I. G's. and the I. C. I.'s and all the rest are anxious to have a seat. They are welcome at the table so far as we are concerned—there is room for all.

Charlie Brown, Bill Luhrs, Bob Heron, Joe Hamilton and Mace White have gone back from the Isco sales convention to their work in Chicago, Boston, Philadelphia, Cleveland and Gloversville respectively. The dope that they and all others assimilated seems to have registered, for orders pile up. Service *does count* and that was the principal subject of discussion among our sales forces at the recent gathering. ISCO SERVICE means what *when* and where the customer wants.

Despite the young hurricane late in January, which smashed up shipping and communication all around Manhattan Island, our spot stocks kept our customers supplied when their incoming shipments were delayed by one of the worst passages that many an "old salt" remembers.

And now don't forget the subscription price to "Isco News Notes" is a postal card with your name and address mailed to us.

We accept no cash for subscriptions but we do guarantee our advertisers.

Prices Current and Comment

Standard Purchasing Power of the Dollar: July 1914 $1.00 - Jan. 1927 68.7c - July 1927 71.7c - Jan. 1928 65.6c

No. 2 regular to 53c @ 54c lb. With any sort of demand, prices here should advance as stocks in both Brazil and Germany are reported in strong hands and being held for higher prices.

Casein — The spot market for Argentine has eased off considerably during the past four weeks and standard ground material is now quoted at 14½c lb. c. i. f. or 17c lb. duty paid, with a possibility of shading this figure on a firm bid. Domestic material if offered at the same levels. There is not much noticeable in the way of consuming interest.

Chlorine — For the past two weeks, business has been routine in most sections. The contract season just closed has been satisfactory in every respect to the manufacturers. Quotations are at 5c lb. for car lots on contract and range to 9¼c in smaller lots.

Copper Sulfate — The tight position of the market during the early days of January has subsided. A good portion of the export demand, which furnished the stimulus to the market at that time has been cared for. Sellers still are unwilling to book contracts further ahead than sixty days. There has not been any change in the status of the domestic consuming markets. These buyers continue to show a moderate interest in the market. Sellers have receded a bit from their ideas of $5.15 100 lbs. for futures and are willing to book business at $5.05 @ $5.10 according to position and quantity.

Copperas — The market has shown no change as to price since last reported, but with stocks in limited supply, sellers ideas are firmer and no sales are known of below $13.00 ton bulk and $18.00 ton bulk in carlots.

Dextrin — The market continues unchanged as to price and is in a firm position. Canary is quoted at $3.77 100 lbs. and potato at 8½c lb. for both white and yellow though this latter grade is not so firm as canary.

Divi Divi — Reports from Asia Minor still lack any evidence promising relief. Prices are still nominal and stocks practically unavailable.

Egg Yolk — Conditions in China still prove handicaps to any great production and maintain the market here in strong position. Prices are unchanged at 76c @ 77c lb.

1914 July	1927 High	1927 Low	1927 Aver.		Current Market	1928 High	1928 Low
2.80	5.60	4.15	4.69	Fish Scrap, dried, wks.....unit	.....	Nom.	Nom.	Nom.
				Acid, Bulk 7 & 3½% delivered				
2.50	3.50	4.24	3.56½	Norfolk & Balt. basis...unit	.....	Nom.	Nom.	Nom.
.08	.14	12½	.13¾	Flake, White, bbls.....lb.	.....	Nom.	Nom.	Nom.
.40	1.10	.90	1.01¾	Flavine, lemon, 55 lb cases...lb.	1.10	1.15	1.15	1.10
.40	1.10	.85	.89	Orange, 70 lb cases.....lb.	1.10	1.15	1.15	1.10
.....				Flavseed.....lb.				
.....	25.00	25.00	25.00	Fluorspar, 95%, 220 lb bags...lb.	.....	.....	.....	.....
.....	.....	.....	.....	Ex-dock.....ton	.....	.....	.....	.....
				Formaldehyde, aniline, 100 lb.	.....	25.00	25.00	25.00
.....	.39	.39	.39	drums.....lb.	.39	.42	.42	.39
.08¼	.11¼	.08¾	.10	USP, 400 lb bbls 1c-1 wks...lb.	.08¾	.09	.09	.08¾
.....	.02½	.02½	.02½	Fossil Flour.....lb.	.02½	.04	.04	.02½
.....	15.00	15.00	15.00	Fullers Earth, bulk, mines...ton	15.00	20.00	20.00	15.00
.....	25.00	25.00	25.00	Imp, powd c-1 bags.....ton	25.00	30.00	30.00	25.00
.....	.17½	.17½	.17½	Furfural, 500 lb drums.....lb.	.17½	.19¼	.19¼	.17½
1.10	1.69	1.35	1.59	Fusel Oil, 10% impurities....gal.	.....	1.35	1.35	1.35
.01½	.04	.04	.04	Fustic, chips.....lb.	.04	.05	.05	.04
.....	.20	.20	.20	Crystals, 100 lb boxes.....lb	.20	.22	.22	.20
.06	.09	.09	.09	Liquid, 50°, 600 lb bbls....lb.	.09	.10	.10	.09
.08	.20	.20	.20	Solid, 50 lb boxes.....lb.	.20	.23	.23	.20
12.00	30.00	30.00	30.00	Sticks.....ton	30.00	32.00	32.00	30.00
1918	.50	.50	.50	G Salt paste, 360 lb bbls.....lb.	.50	.52	.52	.50
.12	.20	.20	.20	Gall Extract.....lb.	.20	.21	.21	.20
.04½	.08	.06	.....	Gambier, common 200 lb cs...lb.	.08	.09	.09	.08
1917	.12	.12	.12	25% liquid, 450 lb bbls....lb.	.12	.14	.14	.12
.05½	.23	.11	.17	Singapore cubes, 150 lb bg..lb.	.11	.12	.12	.11
.....	.45	.30	.43¾	Gelatin, tech, 100 lb cases....lb.	.45	.50	.50	.45
.....	3.14	3.14	3.14	Bags, c-1 NY.....100 lb.	3.14	3.24	3.24	3.14
				Glauber's Salt, tech, 250 lb bags				
.60	1.05	1.05	1.05	c-1 wks.....100 lb.	1.00	1.05	1.05	1.00
				Glucose (grape sugar) dry 70-				
.....	3.24	3.24	3.24	80° bags c-1 NY....100 lb.	3.24	3.34	3.34	3.24
				Tanner's Special, 100 lb bags				
.....	3.14	3.14	3.14	.....100 lb.	.....	3.14	3.14	3.14
.12	.20	.20	.20	Glue, medium white, bbls....lb.	.20	.24	.24	.20
.18	.22	.22	.22	Pure white, bbls.....lb.	.22	.26	.26	.22
.19½	.29	.22	.24	Glycerin, CP, 550 lb drs.....lb.	.17½	.18	.19	.17½
.19¼	.25	.17	.21½	Dynamite, 100 lb drs.....lb.	11½	.12	.15	.11½
.....	.....	.....	.....	Saponification, tanks.....lb.	.09	.09½	.10½	.09
.....	.....	.....	.....	Soap Lye, tanks.....lb.	.08	.08½	.09¼	.08½
.....	15.00	15.00	15.00	Graphite, crude, 220 lb bgs..ton	15.00	35.00	35.00	15.00
.....	.05	.05	.05	Flake, 500 lb bbls.....lb.	.06	.09	.09	.06
				Gums				
				Gum Accroides, Red, coarse and				
.....	.03¾	.03¾	.03¾	fine 140-150 lb bags....lb.	.03¾	.04½	.04½	.03¾
.....	.06	.06	.06	Powd, 150 lb bags.....lb.	.06	.06½	.06½	.06
.....	.18	.18	.18	Yellow, 150-200 lb bags..lb.	.18	.20	.20	.18
				Animi (Zanzibar) bean & pea				
.25	.40	.35	.39	250 lb cases.....lb.	.35	.40	.40	.35
.....	.60	.50	.57½	Glassy, 250 lb cases.....lb.	.50	.55	.55	.50
				Asphaltum ,Barbadoes				
.05	.09	.09	.09	(Manjak) 200 lb bags..lb	.09	.12	.12	.09
.15	.15	.15	.15	Egyptian, 200 lb cases.....lb.	.15	.17	.17	.15
				Gilsonite Selects, 150 lb bags				
36.00	55.00	55.00	55.00	.....ton	55.00	60.00	60.00	55.00
.....	.10½	.07	.10	Batavia Dust, 160 lb bags..lb.	.10½	.11	.11	.10½
.....	.18½	.17½	.18½	E Seeds, 136 lb cases....lb.	.17	.17½	.17½	.17
				F Splinters, 136 lb cases and				
.....	.14	.09	.13	bags.....lb.	.14	.14½	.14½	.14
.....	.34	.33½	.34	Singapore, No. 1, 224 lb caseslb.	.30	.30½	.30½	.30
.14	.22½	.21	.22¼	No. 2, 224 lb cases.....lb.	.20	.21	.21	.20
.08	.14	.11	.12	No. 3, 180 lb bags.....lb.	.14	.15	.15	.14
				Benzoin Sumatra, technical, 120				
.34	.35	.30	.30	lb cases.....lb.	.33	.35	.35	.33
				Copal Congo, 112 lb bags, clean				
.....	.14	.12	.13	opaque.....lb.	.14	.15	.15	.14
.12	.08¾	.08¾	.08¾	Dark, amber.....lb.	.08¾	.09	.09	.08¾
.18	.12½	.12½	.12½	Light, amber.....lb	.12½	.14	.14	.12½
.25	.35	.35	.35	Water white.....lb	.35	.36	.36	.35
				Manila, 180-190 lb baskets				
.15	.16	.16	.16	Loba A.....lb.	.16	.16½	.16½	.16
.....	.15	.15	.15	Loba B.....lb.	.15	.15½	.15½	.15
.....	.14½	.13	.13¾	Loba C.....lb.	.13	.13½	.13½	.13
.....	.16	.16	.16	Pale bold, 224 lb cs.....lb.	.16	.18	.18	.16
.08½	.14	.12	.13	Pale nubs.....lb	.12	.12½	.12½	.12
.....	.07½	.07½	.07½	East Indies chips, 180lb bagslb.	.07½	.08	.08	.07½
.....	.....	.....	.....	Pale bold, 180 lb bags..lb.	.17	.17½	.17½	.17
.....	.17	.17	.17	Pale nubs.....lb.	.14	.14½	.14½	.14
.....	.....	.....	.....	Pontianak, 224 lb cases....lb.				
.13½	.29	.25	.26½	Pale bold gen No. 1.....lb.	.25	.25½	.25½	.25
.07	.19	.13	.15½	Pale gen chips spot.....lb.	.13	.14½	.14½	.13
				Damar Batavia standard 136,				
.17½	.26½	.26½	.25	lb cases.....lb.	.23	.23½	.23½	.23
.....	.14	.13	.13¾	Elemi, No. 1, 80-85 lb cs...lb.	.13½	.14	.14	.13
.....	.13	.12	.12¾	No. 2, 80-85 lb cases.....lb.	.13	.13½	.13½	.13
.....	.13	.11	.11	No. 3, 80-85 lb cases.....lb.	.12	.13	.13	.12
				Kauri, 224-226 lb cases No. 1				
.50	.67½	.57	.63½	.....lb.	.50	.57	.57	.50
.32	.44½	.38	.41	No. 2 fair pale.....lb.	.35	.38	.38	.35
				Brown Chips, 224-226 lb				
.07½	.14½	.10	.12	cases.....lb.	.10	.12	.12	.10
.....	.42	.38	.40	Bush Chips, 224-226 lb				
				cases.....lb.	.38	.40	.40	.38
				Pale Chips, 224-226 lb cases				
.....	.31½	.24½	.25	.....lb.	.24½	.26	.26	.24½
				Sandarac, prime quality, 200				
.19	.27	.25	.25	lb bags & 300 lb casks...lb.	.26	.27	.27	.26
1917	.12	.12	.12	Hematine crystals, 400 lb bbls.lb.	.17	.20	.20	.17
1917	.09	.09	.09	Paste, 500 bbls.....lb	.....	.11	.11	.11
.02¾	.03½	.03½	.03½	Hemlock 25%, 600 lb bbls wks lb.	.03½	.03½	.03½	.03½
.....	16.00	16.00	16.00	Bark.....ton	.....	16.00	16.00	16.00
.....	.60	.45	.56	Hexalene, 50 gal drs wks.....lb.	.....	.60	.60	.60
.....	.80	.62	.72	Hexamethylenetetramine, drs.lb.	.62	.65	.65	.62
2.60	3.35	2.75	3.08	Hoof Meal, fob Chicago.....unit	.....	.....	.....	.....

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Prices Current and Comment

Standard Purchasing Power of the Dollar: July 1914 $1.00 - Jan. 1927 68.7c - July 1927 71.7c - Jan. 1928 65.6c

Epsom Salts — Both imported and domestic are about the same as at the turn of the year, with consuming inquiry routine and the market fairly steady at the levels offered.

Ethyl Acetate — The reduction of early January has been followed by another decline in price owing to the competition among producers and these latter are freely offering at 75c @ 80c gal. as to quantity. Sellers do not profess any alarm at the easy trend of the market.

Glauber Salts — While business in this territory is progressing, there is still a weak condition in New England, where competition from imported and low domestic offers has forced the market to open quotations of 75c @ 80c 100 lbs. end with reports of even lower prices on firm business.

Glue — A good consuming demand is still noticeable on this market and prices are holding up quite well as a result.

Glycerin — On a continued weak market dynamite grade has shown a drop in price for the month of from 3c to 3½c per lb. At the time of going to press the market was quoted at 11½c lb. Some fairly good business was reported at these levels, as consumers feel that it is a good buy at these levels. A surplus of stocks on the market is the primary reason for this unlooked for weakness. This condition has been in evidence since this time last year and has taken its toll in the price. While the other grades are not so noticeably weak, they too are lower at 17½c lb. for chemically pure; 9c lb. for saponification and lye, 8c lb.

Mangove Bark — Decreasing stocks and lack of replacements are said to be the basis for price advances during the past month. Quotations are now at $45.00 ton.

Mercury — The trend of the market for the past month has been downward. Quotations at this time in January were at $126.00 flask and at present offers are heard at $122.00 flask, with a possibility of shading this figure on a firm bid. In one direction offers are heard fractionally below this level. Importers are experiencing a fairly good demand, though buyers continue to hesitate in the face of the gradual easing of the market and as a result sales are not as brisk as they might be on a somewhat firmer market. The London primary market is none too strong, having experienced a 10 shilling cut in price early this month. This fact

1914 July	1927 High	1927 Low	1927 Aver.		Current Market		1928 High	1928 Low
.....	3.90	3.00	3.57	South Amer. to arrive....unit	.....	.....	.....	.....
.....	.30	.22	.24	Hydrogen Peroxide, 100 vol, 140 lb cbys.....lb.	.24	.26	.26	.24
1917	.12	.12	.12	Hpyernic, 51°, 600 lb bbls....lb.	.12	.15	.15	.12
.58	1.28	1.20	1.27	Indigo Madras, bbls.....lb.	1.28	1.30	1.30	1.28
.....	.14	.14	.14	20% paste, drums.....lb.	.14	.15	.15	.14
.....	.07½	.07½	.07½	Solid, powder.....lb.	.07½	.08	.08	.07½
				Iron Chloride, see Ferric or Ferrous				
.04	.09	.09	.09	Iron Nitrate, kegs.....lb.	.09	.10	.10	.09
1.12½	2.50	2.50	2.50	Coml, bbls.....100 lb.	2.50	3.25	3.25	2.50
.....	.10	.10	.10	Oxide, English.....lb.	.10	.12	.12	.10
.....	.02½	.02½	.02½	Red, Spanish.....lb.	.02½	.03½	.03½	.02½
.....	.85	.85	.85	Isopropyl Acetate, 50 gal drs.gal.	.85	.90	.90	.85
.11½	.29	.17	.19	Japan Wax, 224 lb cases.....lb.	.18½	.18½	.19	.18½
.....	60.00	60.00	60.00	Kieselguhr, 95 lb bgs NY....ton	60.00	70.00	70.00	60.00
.....	.03¾	.03¾	.03¾	Larch Extract, 25%, 600 lb bbls wks.....lb.	.03¾	.04	.04	.03¾
.....	.08	.08	.08	Powd, 100 lb bags wks.....lb.	.08	.09	.09	.08
.....	14.00	13.00	13.33	Lead Acetate, bbls wks...100 lb.				
9.12½	14.00	13.00	13.33	White crystals, 500 lb bbls wks.....100 lb.	13.00	13.50	13.50	13.00
.04¼	.15½	.13½	.13	Arsenate, bbls lc-1 wks.....lb.	.13½	.14	.14	.13½
3.90	7.80	6.20	6.78	Metal, c-1 NY.....100 lb.	.....	6.25	6.25	6.25
.07¾	.14	.14	.14	Nitrate, 500 lb bbls wks....lb.	.....	.14	.14	.14
.17½	.17½	.17½	.17½	Oleate, bbls.....lb.	.17½	.18	.18	.17½
.....	.10¾	.08¾	.09	Oxide Litharge, 500 lb bbls..lb.	.....	.08¾	.08¾	.08¾
.05½	.11½	.09¾	.10	Red, 500 lb bbls wks.....lb.	.....	.09¾	.09¾	09¾
.05½	.09¾	.09	.09½	White, 500 lb bbls wks...lb.	.....	.09	.09	.09
.05	.09	.08¾	.08¾	Sulfate, 500 lb bbls wk...lb.	.....	.08¾	.08¾	.08¾
.....	4.50	4.50	4.50	Lime, ground stone bags....ton	.....	4.50	4.50	4.50
.....	1.05	1 05	1.05	Live, 325 lb bbls wks..100 lb.	.....	1.05	1.05	1.05
				Lime Salts, see Calcium Salts				
1918	.15	.15	.15	Lime-Sulfur soln bbls.....gal.	.09	.10	.10	.09
.03¾	.06½	.06½	.06½	Lithopone, 400 lb bbls lc-1 wks .....lb.	.....	.06½	.06½	.06½
.05	.08½	.08½	.08½	Logwood, 51°, 600 lb bbls.....lb.	.08½	.08½	.08½	.08½
.01½	.03	.03	.03	Chips, 150 lb bags.....lb.	.03	.03½	.03½	.03
.06	.12	.12	.12	Solid, 50 lb boxes.....lb.	.....	.12½	.12½	.12½
15.00	26.00	26.00	26.00	Sticks.....ton	26.00	27.00	27.00	26.00
.....	.07½	.07½	.07½	Lower grades.....lb.	.07½	.08	.08	.07½
.12	.30	.30	.30	Madder, Dutch.....lb.¾	.....	.30	.30	.30
30.00	48.00	48 00	48.00	Magnesite, calc, 500 lb bbl..ton	48.00	50.00	50.00	48.00
				Magnesium				
1918	.06½	.06	.06	Magnesium Carb, tech, 70 lb bags NY.....lb.	.06	.06½	.06½	.06
.....	37.00	37.00	37.00	Chloride flake, 375 lb drs c-1 wks.....ton	.....	37.00	37.00	37.00
.....	33.00	33.00	33.00	Imported shipment...ton	.....	33.00	33.00	33.00
.....	31.00	31.00	31.00	Fused, imp, 900 lb bbls NY ton	.....	31.00	31.00	31.00
.....	.10	.10	.10	Fluosilicate, crys, 400 lb bbls wks.....lb.	.10	.10½	.10½	.10
.....	.42	.42	.42	Oxide, USP, light, 100 lb bbls .....lb.	.....	.42	.42	.42
.....	.50	.50	50	Heavy, 250 lb bbls.....lb.	.....	.50	.50	.50
.....	.12½	.09¾	.11½	Silicofluoride, bbls.....lb.	.09¾	.10¼	.10¼	.09¾
.....	.23	.23	.23	Stearate, bbls.....lb.	.23	.25	.25	.23
.20	.24	.24	.24	Manganese Borate, 30%, 200 lb bbls.....lb.	.....	.24	.24	.24
.06	.08	.08	.08	Chloride, 600 lb casks.....lb.	.08	.08½	.08½	.08
.....	.05	.04½	.04¾	Dioxide, tech (peroxide) drs.lb.				
.....	.03	.03	.03	Ore, powdered or granular 75-80%, bbls.....lb.	.48 .03	.50 .03½	.50 .03½	.48 .03
.....	.04	.04	.04	80-85%, bbls.....lb.	.04	.04½	.04½	.04
.....	.05	.05	.05	85-88%, bbls.....lb.	.05	.05½	.05½	.05
.....	.07	.07	.07	Sulfate, 550 lb drs NY.....lb.	.07	.07½	.07½	.07
.....	.03½	.03½	.03½	Mangrove 55%, 400 lb bbls...lb.	.03½	Nom.	Nom.	.03½
.....	39.00	34.00	37.54	Bark, African.....ton	45.00	45.00	45.00	40.00
8.00	10.00	10.00	10.00	Marble Flour, bulk.....ton	10.00	12.00	12.00	10.00
1916	129.00	99.00	119.09	Mercury metal.....75 lb flask	122.00	123.00	127.50	122.00
1918	.72	.72	.72	Meta-nitro-aniline .....lb.	.72	.74	.74	.72
1918	1.70	1.70	1.70	Meta-nitro-para-toluidine 200 lb bbls.....lb.	1.70	1.80	1.80	1.70
1918	.90	.90	.90	Meta-phenylene-diamine 300 lb bbls.....lb.	.90	.94	.94	.90
1918	.72	.72	.72	Meta-toluene-diamine, 300 lb bbls.....lb.	.72	.74	.74	.72
.4	.....	.....	.....	Methanol, (Wood Alcohol), drs				
.45	.80	.55	.69	95%.....gal.	.....	.55	.55	.55
.50	.87	.57	.74½	97%, drums lc-1.....gal.	.....	.57	.57	.57
.....	.....	.....	.....	Pure, drums lc-1.....gal.	.48	.50	.58	.48
.....	.....	.....	.....	Synthetic, drums lc-1.....gal.	.48	.50	58	.48
.....	.80	.75	.78	Denat. grd. tanks.....gal.	.45	.47	.75	.45
.....	.95	.95	.95	Methyl Acetate, drums.....gal.	.....	.95	.95	.95
.....	.88	.75	.66	Acetone, 100 gal drums...gal.	.....	.80	.80	.80
.....	1.00	.85	.92½	Anthraquinone, kegs.....lb.	.85	.95	.95	.85
.....	.55	.55	.55	Chloride, 90 lb cyl.....gal.	.55	.60	.60	.55
.....	.03½	.03½	.03½	Mica, dry grd. bags wks.....lb.	65.00	80.00	80.00	65.00
.....	.05½	.05½	.05½	Wet, ground, bags wks.....lb.	110.00	115.00	115.00	110.00
.....	3.00	3.00	3.00	Michler's Ketone, kegs.....lb.	.10	.10½	.10½	.10
				Monochlorobenzene, drums see, Chlorobenzene, mono.....lb.				
.....	.70	.70	.70	Monoethylorthotoluidin, drs..lb.	.70	.75	.75	.70
1918	1.05	1.05	1.05	Monomethylaniline, 900 lb dr .....lb.	.....	1.05	1.05	1.05
.....	3.95	3.95	3.95	Monomethylparaminosulfate 100 lb drums.....lb.	3.95	4.20	4.20	3.95
.06½	.06½	.06½	.06½	Montan Wax, crude, bags....lb.	.06½	.07	.07	.06½
.....	.04	.04	.04	Myrobalans 25%, liq bbls.....lb.	.04½	.04½	.04½	.04½
.....	.08	.08	.08	50% Solid, 50 lb boxes.....lb.	.08	.08½	.08½	.08
27.00	43.50	41.00	42.00	J 1 bags.....ton	48.00	50.00	50.00	48.00
27.00	37.00	23.50	35.24	J 2 bags.....ton	.....	40.00	40.00	38.00
27.00	37.00	30.00	36.62	R 2 bags.....ton	.....	40.00	40.00	38.00
.10	.21	.18	.19¾	Naphtha, v. m. & p. (deodorized) bbls.....gal.	.....	.18	.18	.18

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Prices Current and Comment

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does not tend toward an upward reaction. In fact, since the peak of over an $130 a flask was reached last Fall the market has been slowly easing off to its present level.

Methanol — While some of the largest producers contend that sales have been of much better volume during the past two weeks, there is no doubt that sales have been made in practically all quarters at prices well below the schedule of prices which have been in force up to the present time. Two sellers report a very satisfactory inquiry at this writing, but despite this there is no reason to believe that prices have shown any firmer tendency than when last reported.

Methyl Acetone — The market has been holding about steady for the past several weeks. There was a reduction shortly after the first of the year, reported last month, but since then the market has held up fairly well.

Myrobolans — Small stocks have had the dual result of decreasing trad ng and increasing prices during the past month. J1 is now quoted at $48.00 @ $50.00 ton; J2 and R2 at $40.00 ton.

Naphthalene—The market is a bit stronger at this writing owing to a shortage in the raw material. An advance in price with the approach of the best selling season is not unlooked for in most quarters. American goods are quoted at 5½c @ 6c lb. for balls and 5c @ 5½c lb. for flakes.

Nickel Salts — Holding up well following the recent shortage and the market is equally as firm as it was in January. Single salts are held at 8¼c lb.

Potash Carbonate — Sellers are quite satisfied with the volume of business for the season and the market is holding steady at 5⅜c lb. for 80-85% calcined. There has not been any change in the position of this or any other grade since the first of the year.

Potash Caustic — With the arrival recently of imported material, offerings on spot have been quite plentiful, but the market has not been adversely affected and dealers report sales at 7⅛c @ 7½c lb. as to seller and quantity.

Rosin—The market during the past month has not been very spectacular either here or in the South. The spot prices have shown narrow movements and during the first week in February the entire market was off about 25 points from that of early January. During the

1914 July	1927 High	1927 Low	1927 Aver.		Current Market	1928 High	1928 Low
.02¾	.06	.05½	.05¾	Naphthalene balls, 250 lb bbls wks.....lb.	.....	.06	.06	.06
.....	.04½	.04½	.04½	Crushed, chipped bgs wks..lb.	.....	.04½	.04½	.04½
.02¾	.05	.04½	.04¾	Flakes, 175 lb bbls wks.....lb.	.....	.05	.05	.05
.....	.21	.21	.21	Nickel Chloride, bbls kegs....lb.	.21	.24	.24	.21
1918	.35	.35	.35	Oxide, 100 lb kegs NY.....lb.	.35	.38	.38	.35
1918	.09	.08½	.08¾	Salt dbl, 400 lb bbls NY....lb.	.09	.09¼	.09¼	.09
1918	.08¾	.08	.08¼	Single, 400 lb bbls NY.....lb.	.08¼	.09	.09	.08¾
.....	1.25	1.10	1.24	Nicotine, free 40%, 8 lb tins, cases.....lb.	1.25	1.30	1.30	1.25
.....	1.10	1.10	1.10	Sulfate, 10 lb tins.....lb.	.....	1.10	1.10	1.10
.....	13.00	13.00	13.00	Nitre Cake, 500 lb bbls.....ton	13.00	14.00	14.00	13.00
.06½	.10¼	.09¼	.09¼	Nitrobenzene, redistilled, 1000 lb drs wks.....lb.	.10¼	.10½	.10½	.10¼
.....	.40	.40	.40	Nitrocellulose, regular drums wks.....lb.	.40	Nom.	Nom.	.40
.....	.55	.55	.55	Low viscosity (soln only) Grade 1 drums, wks.....lb.	.55	Nom.	Nom.	.55
.....	.50	.50	.50	Grade 2 drums, wks.....lb.	.50	Nom.	Nom.	.50
3.05	3.60	3.35	3.53	Nitrogenous Material, bulk..unit	.....	3.35	3.35	3.35
1918	.25	.25	.25	Nitronaphthalene, 550 lb bbls.lb.	.....	.25	.25	.25
1918	.14	.14	.14	Nitrotoluene, 1000 lb drs wks.lb.	.14	.15	.15	.14
.16	.25	.25	.25	Nutgalls Aleppy, bags.....lb.	.25	Nom.	Nom.	.25
.15	.17	.17	.17	Chinese, bags.....lb	.17	.18	.18	.17
.....	.22	.22	.22	Powdered, bags.....lb	.22	.24	.24	.22
.08	.03½	.03½	.03½	Oak, tanks, wks.....lb	....	.03½	.03½	.03½
.08	.04	.04	.04	23-25% liq., 600 lb bbl wk .lb.	.04	.04½	.04½	.04
.....	45.00	45.00	45.00	Oak Bark, ground.....ton	45.00	50.00	50.00	45.00
.....	20.00	20.00	20.00	Whole.....ton	20.00	23.00	23.00	20.00
.07½	.14½	.13	.13½	Orange-Mineral, 1100 lb casks NY.....lb.	.13	.13¼	.13½	.13
.....	2.20	2.20	2.20	Orthoaminophenol, 50 lb kgs..lb.	2.20	2.25	2.25	2.20
.....	2.50	2.35	2.36¼	Orthoanisidine, 100 lb drs....lb.	2.35	2.50	2.50	2.35
.....	.50	.50	.50	Orthochlorophenol, drums....lb.	.50	.65	.65	.50
.....	.18	.18	.18	Orthocresol, drums.....lb.	.18	.28	.28	.18
1918	.06	.06	.06	Orthodichlorobenzene, 1000 lb drums.....lb	.06	.07	.07	.06
1918	.32	.32	.32	Orthonitrochlorobenzene, 1200 lb drs wks.....lb.	.32	.35	.35	.32
1918	.13	.13	.13	Orthonitrotoluene, 1000 lb drs wks.....lb.	.17	.18	.18	.17
1918	.85	.85	.85	Orthonitrophenol, 350 lb dr...lb.	.85	.90	.90	.85
1918	.29	.25	.28	Orthotoluidine, 350 lb bbl 1c-1.lb.	.29	.31	.31	.29
1918	.70	.70	.70	Orthonitroparachlorphenol, tins .....lb.	.70	.75	.75	.70
.....	.16	.16	.16	Osage Orange, crystals.....lb.	.16	.17	.17	.16
1918	.07	.07	.07	51 deg. liquid.....lb.	.07	.07½	.07	.07
.....	.14½	.14½	.14½	Powdered, 100 lb bags.....lb.	.14½	.15	.15	.14½
.04¾	.06½	.06½	.06½	Paraffin, refd, 200 lb cs slabs 123-127 deg. M. P.....lb.	.06½	.06¾	.06¾	.06½
.05¼	.07½	.07½	.07½	128-132 deg. M.P.....lb.	.07½	.07¾	.07¾	.07½
.06½	.08	.08	.08	133-137 deg. M.P.....lb.	.08	.08½	.08½	.08
1918	.08¾	.08¾	.08¾	138-140 deg. M.P.....lb.	.08¾	.10	.10	.08¾
.....	.29	.26	.26½	Para Aldehyde, 110-55 gal drs.lb.	.26	.28	.28	.26
1918	1.00	1.00	1.00	Aminoacetanilid, 100 lb bg.lb.	1.00	1.05	1.05	1.00
.....	1.25	1.25	1.25	Aminohydrochloride, 100 lb kegs .....lb.	1.25	1.30	1.30	1.25
.....	.15	.15	.15	Aminophenol, 100 lb kegs...lb.	.....	1.15	1.15	1.15
.....	.50	.50	.50	Chlorophenol, drums.....lb.	.50	.65	.65	.50
.....	.12	.12	.12	Coumarone, 330 lb drums..lb.	.....	.....	.....	.....
.....	2.25	2.25	2.25	Cymene, refd, 110 gal dr...gal.	2.25	2.50	2.50	2.25
1918	.17	.17	.17	Dichlorobenzene, 150 lb bbls wks.....lb.	.17	.20	.20	.17
1918	.53	.50	.50½	Nitroacetanilid, 300 lb bbls.lb.	.50	.55	.55	.50
1917	.52	.52	.52	Nitroaniline, 300 lb bbls wks .....lb.	.48	.49	.49	.48
.....	.32	.32	.32	Nitrochlorobenzene, 1200 lb drs wks.....lb.	.....	.32	.32	.32
1918	2.75	2.75	2.75	Nitro-orthotoluidine, 300 lb bbls.....lb.	2.75	2.85	2.85	2.75
1918	.50	.50	.50	Nitrophenol, 185 lb bbls....lb.	.50	.55	.55	.50
.....	.92	.92	.92	Nitrosodimethylaniline, 120 lb bbls.....lb.	.92	.94	.94	.92
1918	.30	.25	.26	Nitrotoluene, 350 lb bbls...lb.	.....	.30	.30	.30
1918	1.20	1.15	1.18	Phenylenediamine, 350 lb bbls .....lb.	1.15	1.20	1.20	1.15
.....	.40	.40	.40	Toluenesulfonamide, 175 lb bbls.....lb.	.40	.41	.41	.40
.....	.20	.18	.19	Toluenesulfonchloride, 410 lb bbls wks.....lb.	.20	.22	.22	.20
1918	.45	.38	.41	Toluidine, 350 lb bbls wk...lb.	.40	.42	.42	.40
.11	.21	.21	.21	Paris Green, Arsenic Basis 100 lb kegs.....lb.	.21	.22	.22	.21
.....	.19	.19	.19	500 lb kegs.....lb.	.19	.20	.20	.19
.12	.25	.25	.25	Persian Berry Ext., bbls.....lb.	.....	.....	.....	.....
.....	.02½	.02½	.02½	Petrolatum, Green, 300 lb bbl.lb.	.02½	.03	.03	.02½
1918	.18	.16	.17	Phenol, 250-100 lb drums.....lb.	.17	.20	.20	.17
1918	1.35	1.28	1.35	Phenyl - Alpha - Naphthylamine, 100 lb kegs.....lb.	.....	1.35	1.35	1.35
45.00	9.00	8.50	8.75	Phosphate Acid, 16% blk wks.ton	.....	9.00	9.00	9.00
3.00	3.00	3.00	3.00	Phosphate Rock, f.o.b. mines Florida Pebble, 68% basis..ton	3.00	3.15	3.15	3.00
2.00	3.50	3.50	3.50	70% basis.....ton	3.50	3.65	3.65	3.50
.....	4.00	3.85	3.96	72% basis.....ton	4.00	4.15	4.15	4.00
4.00	5.35	5.00	5.09	75-74% basis.....ton	.....	5.00	5.00	5.00
4.00	5.75	5.60	5.71½	75% basis.....ton	.....	5.75	5.75	5.75
5.75	6.25	6.00	6.19	77-76% basis.....ton	.....	6.25	6.25	6.25
4.50	5.50	5.00	5.12½	Tennessee, 72% basis.....ton	.....	5.00	5.00	5.00
.....	.35	.35	.35	Phosphorous Oxychloride 175 lb cyl.....lb.	35	.40	.40	.35
.45	.65	.60	.62	Red, 110 lb cases.....lb.	. 60	.65	.65	.60
35	.32	.32	.32	Yellow, 110 lb cases wks.lb.	.....	.32	.32	.32
.	.46	.46	.46	Sesquisulfide, 100 lb cs.....lb.	.....	.46	.46	.46
....	.35	.35	.35	Trichloride, cylinders.....lb.	.....	.....	.....	.....
.....	.18	.18	.18	Phthalic Anhydride, 100 lb bbls wks.....lb.	.18	.20	.20	.18

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Prices Current and Comment

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first few days of the month the spot market was quoted at B,D, $9.35; E,F, $9.55; G, $9.65; H, $9.70; I, $9.80; K, $9.90; M, $10.00; N, $10.70; WG, $11.60 and WW, $12.40.

Shellac — A very definite price movement downward which was beginning to be evident at the last report, has taken place during the past month. Reports emanating from the primary markets that this year's crop is an unusually large one, are held to be responsible for the sharp decline in prices. Demand continues good, and most factors seem to feel that prices will go no lower as large interests controlling the primary sources will hold for better prices. Bone dry is now at 54c @ 55c lb., garnet at 46c @ 47c lb., superfine at 49c @ 50c lb. and T. N. at 47c @ 48c lb.

Soda Ash — As with the other products of this group, is experiencing a quiet reaction, following the rush of the contract season, Spot demand at the moment is routine, and makers and dealers are busy on contract.

Soda Chlorate — Dealers reports very active interest in the consuming fields and sales of a very satisfactory nature for this time of year. The market is firmly held at 6½c @ 6¾c lb. in all directions.

Soda Caustic — Movement of material on new contracts during the past month has been quite brisk and while spot sales have been light the movement of these contracts lot is well up to the average for the month. Prices are holding up well.

Sodium Flouride — Unchanged over the month following the fractional reduction about a month ago to 8½c lb. there has not been any change in price and the market has been devoid of change since that time.

Sodium Nitrate — Increasing production and large supplies available in Chile have created easier conditions in this market. Trading continues quiet and buying in small volume as consumers evidently expect further price reductions. It is now being quoted at $2.35 per 100 lb.

Solvent Naphtha—Producers continue to quote 35c gal. in tanks and ranging to 40c gal. in drums. During the month the market has continued just about steady at the market levels and has been rather without feature.

Tankage — Ground tankage at New York has declined in price, now being quoted at $5.00 and 10c unit with but few sales. The Chicago market remains unchanged at $3.90 and 10c unit. The

1914 July	1927 High	1927 Low	1927 Aver.		Current Market		1928 High	1928 Low
.....	40.00	37.00	38.50	Pigments Metallic, Red or Brown bags, bbls, Pa. wks....ton	37.00	45.00	45.00	37.00
				Pine Oil, 55 gal drums or bbls				
1918	.63	.63	.63	Destructive dist.....lb.	.63	.64	.64	.63
.....	8.00	8.00	8.00	Prime bbls.....bbl.	8.00	10.60	10.60	8.00
.34	.70	.66	.69	Steam dist. bbls.....gal.	.....	.70	.70	.70
				Pitch Hardwood, ...				
37.50	40.00	40.00	40.00	wks.....ton	40.00	45.00	45.00	40.00
				Plaster Paris, tech, 250 lb bbls				
1.50	3.30	3.30	3.30	.....bbl.	.....	3.30	3.30	3.30
				Potash				
.04½	.07½	.07½	.07½	Potash, Caustic, wks.....lb.	.....	.07½	.07½	.07½
.....	.07½	.07½	.07½	Imported casks c-1.....lb.	.....	.07½	.07½	.07½
				Potash Salts, Rough Kainit				
8.36	9.00	9.00	9.00	12.4% basis bulk.....ton	.....	9.00	9.00	9.00
.....	9.50	9.50	9.50	14% basis.....ton	.....	9.50	9.50	9.50
				Manure Salts.....				
13.58	12.40	12.40	12.40	20% basis bulk.....ton	.....	12.40	12.40	12.40
.....	18.75	18.75	18.75	30% basis bulk .....ton	.....	18.75	18.75	18.75
				Potassium Muriate, 80% basis				
39.07	36.40	36.40	36.40	bags.....ton	.....	36.40	36.40	36.40
				Pot. & Mag. Sulfate, 40% basis				
25.04	27.00	27.00	27.00	bags.....ton	.....	27.00	27.00	27.00
				Potassium Sulfate, 90% basis				
47.57	47.30	47.30	47.30	bags.....ton	.....	47.30	47.30	47.30
				Potassium Bicarbonate, USP, 320				
.08	.09	.09	.09	lb bbls.....lb.	.09	.09½	.09½	.09
				Bichromate Crystals, 725 lb				
.06¼	.08¼	.08	.08¼	casks.....lb.	.08¼	.08¾	.08¾	.08¼
.....	.12	.11	.11	Powd., 725 lb cks wks....lb.	.12	.12½	.12½	.12
.....	.16	.16	.16	Binoxiate, 300 lb bbls.....lb.	.16	.17	.17	.16
.....	.30	.30	.30	Bisulfate, 100 lb kegs.....lb.	.....	.30	.30	.30
				Carbonate, 80-85% calc. 800				
.03½	.05½	.05½	.05½	lb casks.....lb.	.05⅝	.05¾	.05¾	.05⅝
				Chlorate crystals, powder 112				
.07¼	.08½	.08½	.08½	lb keg wks.....lb.	.08½	.09	.09	.08½
				Potassium Chlorate, Imp 112 lb				
.....	.08¾	.08¼	.08¼	kegs NY.....lb.	.08¼	.08½	.08½	.08¼
	.05¼	.05¼	.05¼	Chloride, crys bbls.....lb.	.05⅜	.05½	.05½	.05⅜
.....	.27	.27	.27	Chromate, kegs.....lb.	.27	.28	.28	.27
.20	.55	.55	.55	Cyanide, 110 lb. cases.....lb.	.55	.57½	.57½	.55
.13	.11½	.11½	.11½	Metabisulfite, 300 lb. bbl..lb.	.11½	.12	.12	.11½
.14	.16	.16	.16	Oxalate. Neut. 225 lb. bbls.lb.	.16	.17	.17	.16
.....	.11	.11	.11	Perchlorate, casks wks.....lb.	.11	.12	.12	.11
				Permanganate, USP, crys 500				
.09½	.15¼	.14½	.14½	& 100 lb drs wks.....lb.	.15½	.15½	.15½	.15½
.21	.39	.37½	.38	Prussiate, red, 112 lb keg...lb.	.37½	.38	.38	.37½
.12½	.18	.18	.18	Yellow, 500 lb casks.....lb.	.18	.18½	.18½	.18
.....	.51	.51	.51	Tartrate Neut, 100 lb keg...lb.	.....	.51	.51	.51
				Titanium Oxalate, 200 lb bbls				
.....	.25	.25	.25	.....lb.	.....	.25	.25	25
.....	.04	.04	.04	Pumice Stone, lump bags.....lb.	.04	.05	.05	.04
.04½	.04½	.04½	.04½	250 lb bbls.....lb.	.04½	.06	.06	.04½
.01½	.02½	.02½	.02½	Powdered, 350 lb bags.....lb.	.02½	.03	.03	.02½
2.65	3.75	3.75	3.75	Putty, commercial, tubs..100 lb.	.....	.03½	.03¼	.03¼
4.25	5.50	5.50	5.50	Linseed Oil, kegs.....100 lb.	.....	.05½	.05½	.05½
.....	3.00	1.50	.94	Pyridine, 50 gal drums.....gal.	.....	1.50	1.50	1.50
				Pyrites, Spanish cif Atlantic				
.10½	.13	.12	.12½	ports bulk.....unit	.13	.13¾	.13¾	.13
.02¼	.03	.03	.03	Quebracho, 35% liquid tks....lb.	.03	.03½	.03½	.03
.....	.03½	.03½	.03½	450 lb bbls c-1.....lb.	.03½	.04	.04	.03½
.....	.04	.04	.04	35% Bleaching, 450 lb bbl..lb.	.04	.05	.05	.04
.04¼	.05	.04¾	.04¾	Solid, 63%, 100 lb bales cif.lb.	.05½	.05½	.05½	.05
.....	.05	.05	.05	Clarified, 64%, bales.....lb.	.....	.05½	.05¼	.05
				Quercitron, 51 deg liquid 450 lb				
.01½	.06½	.06½	.06½	bbls.....lb.	.05½	.06	.06	.05½
.02¼	.10	.10	.10	Solid, 100 lb boxes.....lb.	.10	.13	.13	.10
22.00	14.00	14.00	14.00	Bark, Rough.....ton	.....	14.00	14.00	14.00
.....	34.00	34.00	34.00	Ground.....ton	34.00	35.00	35.00	34.00
1918	.45	.45	.45	R Salt, 250 lb bbls wks.....lb.	.45	.46	.46	.45
.03	.18	.18	.18	Red Sanders Wood, grd bbls..lb.	.....	.....	.....	.....
1918	1.25	1.25	1.25	Resorcinol Tech, cans.....lb.	1.80	2.00	2.00	1.80
				Rosin Oil, 50 gal bbls, first run				
.27	.67	.57	.59	.....gal.	.....	.57	.57	.57
.38	.72	.62	.64	Second run.....gal.	.....	.62	.62	.62
				Rosins, 600 lb bbls 280 lb...unit				
4.37½	13.00	8.50	10.08½	B.....	.....	9.10	9.10	9.00
4.42½	13.00	8.50	10.17	D.....	.....	9.20	9.65	9.20
4.42½	13.15	8.50	10.23	E.....	.....	9.40	9.75	9.40
4.47½	13.20	8.50	10.49	F.....	.....	9.45	9.95	9.45
4.47½	13.25	8.50	10.58½	G.....	.....	9.55	10.00	9.55
4.47½	13.30	8.50	10.65	H.....	.....	9.50	10.05	9.50
4.55	13.35	8.55	10.79½	I.....	.....	9.60	10.10	9.60
4.49½	14.80	8.65	11.05	K.....	.....	9.70	10.15	9.70
5.47½	15.00	8.80	11.15½	M.....	.....	9.85	10.30	9.85
6.12½	15.85	9.15	11.62	N.....	.....	10.45	11.00	10.45
6.67½	16.60	10.50	12.58	WG.....	.....	11.20	11.65	11.20
6.92½	18.55	12.00	14.34	WW.....	.....	12.00	12.65	12.00
.....	24.00	24.00	24.00	Rotten Stone, bags mines....ton	24.00	30.00	30.00	24.00
.....	.07	.07	.07	Lump, imported, bbls.....lb.	.07	.08	.08	.07
.05½	.09	.09	.09	Selected bbls.....lb.	.09	.12	.12	.09
.02½	.02	.02	.02	Powdered, bbls.....lb.	.02	.05	.05	.02
.02¾	.04½	.04¼	.04¼	Sago Flour, 150 lb bags.....lb.	.04½	.05	.05	.04½
.60	.90	.90	.90	Sal Soda, bbls wks.....100 lb.	.....	.....	.....	.....
11.00	19.00	19.00	19.00	Salt Cake, 94-96% c-l wks...ton	19.00	20.00	20.00	19.00
8.00	15.00	15.00	15.00	White, 87% wks.....ton	15.00	17.00	17.00	15.00
				Saltpetre, double refd granular				
.04½	.06½	.06½	.06½	450-500 lb bbls.....lb.	.06½	.06½	.06½	.06½
.....	.01½	.01½	.01½	Satin, White, 500 lb bbls.....lb.	.....	.01½	.01½	.01½
.18½	.66	.47	.57	Shellac Bone dry bags,.....lb.	.54	.55	.61	.54
.15	.57	.41	.48	Garnet, bags.....lb.	.46	.47	.55	.46
.14½	.65	.40	.52½	Superfine, bags.....lb.	.49	.50	.58	.49
.15½	.37	.57	.49	T. N. bags.....lb.	.47	.48	.55	.47
1918	.50	.50	.50	Schaeffer's Salt, kegs.....lb.	.53	.57	.57	.53

Chemical Progress

is always forecast in

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Prices Current and Comment

Standard Purchasing Power of the Dollar: July 1914 $1.00 - Jan. 1927 68.7c - July 1917 71.7c - Jan. 1928 65.6c

South American market continues strong due to decreased stocks following heavy demand from Pacific Coast buyers. As a consequence the price has advanced to $5.00 and 10c unit.

Tin Salts — Following the fluctuations of the raw material market the salts have taken a downward turn since last reported and crystals, bichloride and tetrachloride are all quoted from 1¼c to 1½c lb. lower at 40c lb. for crystals, 16¼c lb. for bichloride and 34c lb. for tetrachloride. Consuming demand has not been affected, holding about up to the average.

Toluene—The movement into consuming channels during January has been brisk. Lacquer manufacturers are coming into the market at regular intervals for supplies and find the market quite firm at the quoted levels of 35c gal. in tanks and 40c gal. in drums. Sellers are having no difficulty in moving the full output into consuming channels at the market levels.

Turpentine—With varying fluctuations during the month the spot market is at the same level as it was shortly after the first of the year. Demand has been limited and the market is holding fairly steady at 61c @ 62c gal. In Savannah stocks are believed of sufficient volume to hold the market from advancing beyond this level for the present, at least.

Wattle Bark — The price has been reduced to $66.00 ton since last reported as the former price of $76.00 ton was absolutely prohibitive. Even at this lower figure little trading is expected. No relief, however, is to be expected before summer. Prices on extract are entirely nominal and in fact little is being produced because of the high price of bark.

Zinc Ammonium Chloride — The domestic market is holding up steadily at 5¾c lb. and sellers say that they are finding less resistance to this level, though at the moment the consuming demand is none too plentiful.

OILS AND FATS

Chinawood Oil — When last reported, prices on the Coast were at 14c lb. Immediately afterward a shortage of shipments occurred and the price reached a high level of 16c lb. A reaction followed

1914 July	1927 High	1927 Low	1927 Aver.		Current Market	1928 High	1928 Low
.....	6.00	6.00	6.00	Silica, Crude, bulk mines....ton	8.00	11.00	11.00	8.00
.....	15.00	15.00	15.00	Refined, floated bags.....ton	22.00	30.00	30.00	22.00
.....	32.00	32.00	32.00	Air floated bags.....ton	.....	.....	.....	.....
.....	55.00	55.00	55.00	Extra floated bags.....ton	32.00	40.00	40.00	32.00
10.00	15.00	15.00	15.00	Soapstone, Powdered, bags f.o.b. mines.....ton	15.00	22.00	22.00	15.00
				Soda				
.67½	1.32½	1.32½	1.32½	Soda Ash, 58% dense, bags c-1 wks.....100 lb.	.....	1.40	1.40	1.40
.57½	2.14	2.04	2.12	58% light, bags del NY.100 lb.	2.04	2.29	2.29	2.04
.....	1.32½	1.32½	1.32½	Contract, bags c-1 wks.100 lb.	.....	1.32½	1.32½	1.32½
2.50	4.16	4.06	4.14½	Soda Caustic, 76% grnd & flake drums del NY.....100 lb.	4.16	4.21	4.21	4.16
.....	3.76	3.66	3.74½	76% solid drs del NY...100 lb.	3.76	3.91	3.91	3.76
.....	3.00	3.00	3.00	Contract, c-1 wks.....100 lb.	.....	3.00	3.00	3.00
.03½	.04½	.04½	.04½	Sodium Acetate, crystals, 450 lb bbls wks.....lb.	.04½	.05	.05	.04½
.....	.19	.18	.18½	Arsenate, drums.. .....lb.	.....	.....	.....	.....
.....	1.00	1.00	1.00	Arsenite, drums.....gal.	.....	.....	.....	.....
1.00	2.41	2.41	2.41	Bicarb., 400 lb bbl NY..100 lb.	.....	2.41	2.41	2.41
.04½	.06½	.06½	.06½	Bichromate, 500 lb cks wks.lb.	.06½	.06½	.06½	.06½
.02½	.08½	.08½	.08½	Bisulfite, 500 lb bbl wks....lb.	.....	.04	.04	.04
.60	1.30	1.30	1.30	Carb. 350 lb bbls NY...100 lb.	1.30	1.35	1.35	1.30
.07½	.06½	.06½	.06½	Chlorate, 112 lb kegs wks...lb	.06½	.06½	.06½	.06½
.....	12.00	12.00	12.00	Chloride, technical.....ton	12.00	13.00	13.00	12.00
.22	.20	.20	.20	Cyanide, 96-98%, 100 & 250 lb drums wks.....lb.	.....	.20	.20	.20
1918	.08½	.08½	.08½	Fluoride, 300 lb bbls wks...lb.	.08½	.09	.09	.08½
.....	.22	.22	.22	Hydrosulfite, 200 lb bbls f.o.b. wks.....lb.	.22	.24	.24	.22
.....	.05	.05	.05	Hypochloride solution, 100 lb cbys.....lb.	.....	.05	.05	.05
1.40	2.65	2.65	2.65	Hyposulfite, tech, pea crys 375 lb bbls wks....100 lb.	2.65	3.05	3.05	2.65
1.30	2.40	2.40	2.40	Technical, regular crystals 375 lb bbls wks... 100 lb.	2.40	2.65	2.65	2.40
.....	.70	.45	.62	Metanilate, 150 lb bbls.....lb.	.....	.45	.45	.45
.....	.02½	.02½	.02½	Monohydrate, bbls.....lb.	.....	.....	.....	.....
1918	.55	.55	.55	Naphthionate, 300 lb bbl...lb.	.55	.57	.57	.55
2.12½	2.67	2.25	2.52½	Nitrate, 92%, crude, 200 lb bags c-1 NY.....100 lb.	.....	2.35	2.45	2.35
.05½	.08½	.08	.08	Nitrite, 500 lb bbls spot ...lb.	.08	.08½	.08½	.08
.....	.25	.25	.25	Orthochlorotoluene, sulfonate, 175 lb bbls wks.....lb	.25	.27	.27	.25
.....	.20	.20	.20	Oxalate Neut, 100 lb kegs..lb.	.20	.23	.23	.20
.....	3.90	3.90	3.90	Paratoluene, tri-sodium, tech. 100 lb bbls c-1....100 lb.	.....	3.90	3.90	3.90
.....	.08	.08	.08	Sulfonate, 175 lb bbls....lb.	.08	.09	.09	.08
.19	.21	.21	.21	Perborate, 275 lb bbls.....lb.	.21	.22	.22	.21
2.12½	3.25	3.25	3.25	Phosphate, di-sodium, tech. 550 lb bbls.....100 lb.	3.25	3.55	3.55	3.25
.....	.69	.69	.69	Picramate, 100 lb kegs.....lb.	.69	.72	.72	.69
.08½	.12	.11	.12	Prussiate, Yellow, 350 lb bbl wks.....lb.	.12	.12½	.12½	.12
.....	.13½	.13½	.13½	Pyrophosphate, 100 lb keg..lb.	.13½	.14	.14	.13½
.02	1.20	1.20	1.20	Silicate, 40 deg clear 55 gal drs wks.....100 lb.	1.20	1.45	1.45	1.20
.02	.85	.85	.85	40 deg turbid 55 gal drs wks.....100 lb.	.85	1.10	1.10	.85
.....	.04½	.04½	.04½	Silicofluoride, 450 lb bbls NY .....lb.	.04½	.05	.05	.04½
.....	.48½	.48½	.48½	Stannate, 100 lb drums.....lb.	.48½	.49	.49	.48½
.....	.20	.20	.20	Stearate, bbls.....lb.	.20	.29	.29	.20
.....	.16	.16	.16	Sulfanilate, 400 lb bbls.....lb.	.16	.18	.18	.16
.....	.02½	.02½	.02½	Sulfate Anhyd., 550 lb bbls c-1 wks.....lb.	.02½	.02½	.02½	.02½
.01½	.02½	.02½	.02½	Sulfide, 30% crystals, 440 lb bbls wks.....lb.	.02½	.02½	.02½	.02½
.....	.03½	.03½	.03½	62% solid, 650 lb drums 1c-1 wks.....lb.	.03½	.04	.04	.03½
.02½	.03½	.03½	.03½	Sulfite, crystals, 400 lb bbls wks.....lb.	.03½	.03½	.03½	.03½
.....	.40	.40	.40	Sulfocyanide, bbls.....lb.	.40	.50	.50	.40
.....	.85	.80	.82½	Tungstate, tech, crystals, kegs .....lb.	.80	.85	.85	.80
1917	.40	.35	.37	Solvent Naphtha, 110 gal drs wks.....gal.	.35	.40	.40	.35
1918	.01½	.01½	.01½	Spruce, 25% liquid, bbls.....lb.	.....	.01½	.01½	.01½
1918	.01	.01	.01	25% liquid, tanks wks.....lb.	.....	.01	.01	.01
.....	.02	.02	.02	50% powd., 100 lb bag wks.lb.	.02	.02½	.02½	.02
.....	3.22	3.07	3.14½	Starch, powd., 140 lb bags c-1 .....100 lb.	.....	3.42	3.42	3.07
1.99	3.12	2.97	3.03	Pearl, 140 lb bags.....100 lb.	.....	3.32	3.32	2.97
.05½	.06	.04½	.05½	Potato, 200 lb bags c-1.....lb	.06	.06½	.06½	.06
.05½	.06½	.06½	.06½	Imported bags.....lb	.06½	.06½	.06½	.06½
.05½	.08	.06	.07	Soluble.....lb.	.08	.08½	.08½	.08
.07	.09½	.09	.09½	Rice, 200 lb bbls.....lb.	.09½	.10	.10	.09½
.04½	.06½	.06½	.06½	Wheat, thick bags.....lb.	.06½	.07	.07	.06½
.04½	.09½	.09½	.09½	Thin bags.....lb.	.09½	.10	.10	.09½
1918	.07½	.07½	.07½	Strontium carbonate, 600 lb bbls wks.....lb	.07½	.07½	.07½	.07½
.07½	.08½	.08	.08	Nitrate, 600 lb bbls NY....lb.	.08½	.09	.09	.08½
				Sulfur				
1.85	2.05	.205	2.05	Sulfur Brimstone, broken rock, 250 lb bag c-1.....100 lb.	.....	2.05	2.05	2.05
.....	18.00	18.00	18.00	Crude, f.o.b. mines.... ton	18.00	19.00	19.00	18.00
.....	2.40	2.40	2.40	Flour for dusting 99½%, 100 lb bags c-1 NY.....100 lb.	.....	2.40	2.40	2.40
2.00	2.50	2.50	2.50	Heavy bags c-1.....100 lb.	.....	2.50	2.50	2.50
2.20	3.45	3.45	3.45	Flowers, 100%, 155 lb bbls c-1 NY.....100 lb.	.....	3.45	3.45	3.45
1.85	2.65	2.65	2.65	Roll, bbls 1c-1 NY.....100 lb.	2.65	2.85	2.85	2.65

Soda Ash

Caustic Soda

Bicarbonate of Soda

Michigan Alkali Company

General Sales Department: 21 East 40th St., New York City

Chicago Office: 1316 South Canal Street

Works: Wyandotte, Mich.

Prices Current and Comment

Standard Purchasing Power of the Dollar: July 1914 $1.00 - Jan. 1927 68.7c - July 1927 71.7c - Jan. 1928 65.6c

so that within a week the price had declined to 14c lb. at the Coast, with the spot market at 16⅛c @ 17c lb. The only change since then has been an increase in the Coast price to 14¾c lb. The market has been holding steady at that price for the past two weeks with long interests sold out, conditions in China preventing shipments of any quantity, and dealers holding for higher prices.

Coconut Oil — Strong in the face of light demand. The only price changes since last reported have been an increase in the tank price of Cochin to 9¾c lb. and decrease in price of Coast tanks of Manila to 8⅜c @ 8½c lb. Seems likely to go higher, however, as reports from the Philippines indicate that arrivals of copra are almost negligible.

Corn Oil — Continued scarcity has caused a further decrease in tank price of crude oil at the mills, it now being quoted at 10c lb.

Cottonseed Oil — Easy conditions have been prevalent during the past month. Crude oil has gradually declined in price from 8¾c @ 9c lb. when last reported to 8⅛c @ 8⅜c lb. and finally to 8c lb. PSY has been subject to the usual fluctuations on spot price but such variations have been confined between 10c and 10½c lb. The easy conditions existing in the market have been chiefly reflected in the low price of futures which for Mar.-May have averaged between 9.90c and 10c lb.

Greases — During the past month brown and yellow have held steady but choice white has experienced a gradual decline in price. From its position at 10⅛c lb. it has slumped, due to an utter lack of demand, to 10c @ 10¼c lb. where it seems certain that it will find its way to the soap kettle.

Lard Oil — In a month which has witnessed the weakening of the animal group, this oil has remained firm the only decline being one in Extra No. 1 to 12c lb.

Linseed Oil — Has gradually advanced in price from 10c lb. for five-barrel lots, 9.6c lb. on spot and 8.8c lb. in tanks to 10.4c lb., 10c lb. and 9.2c lb. respectively. It has held steady at these latter prices for two weeks despite easy and quiet conditions in the market. On a firm bid, however, the price would be shaded to 9.8c lb.

Menhaden Oil — Practical depletion of all stocks has put the price of tanks at Baltimore on a purely nominal basis in which condition it will continue unti' the Spring season opens. All other grades are unchanged.

1914 July	1927 High	1927 Low	1927 Aver.		Current Market	1928 High	1928 Low
				Sulfur Chloride, red, 700 lb drs			
.....	.05	.05	.05	wks.....lb.	.05	.05½	.05½	.05
.....	.03¾	.03¼	.03½	Yellow, 700 lb drs wks.....lb.	.03½	.04½	.04½	.03½
.....	.08	.08	.08	Sulfur Dioxide, 150 lb cyl....lb.	.08	.08½	.08½	.08
.....	.17	.17	.17	Extra, dry, 100 lb cyl.....lb.	.17	.19	.19	.17
.....	.65	.65	.65	Sulfuryl Chloride, 600 lb dr...lb	.10	.65	.65	.10
.....	.11	.11	.11	Stainless, 600 lb bbls.....lb.	.11	.11½	.11½	.11
.....	.05	.05	.05	Extract, 450 lb bbls.....lb.	.05½	.06	.06	.05½
.....	130.00	130.00	130.00	Sicily Leaves, 100 lb bg...ton	.....	130.00	130.00	130.00
62.00	80.00	72.00	73.75	Ground shipment.....ton	.....	72.00	72.00	72.00
40.00	55.00	55.00	55.00	Virginia, 150 lb bags.....ton	55.00	60.00	60.00	55.00
.....	12.00	12.00	12.00	Talc, Crude, 100 lb bgs NY..ton	12.00	15.00	15.00	12.00
15.00	16.00	16.00	16.00	Refined, 100 lb bgs NY..ton	16.00	18.00	18.00	16.00
15.00	30.00	30.00	30.00	French, 220 lb bags NY...ton	30.00	35.00	35.00	30.00
.....	38.00	38.00	38.00	Refined, white, bags....ton	38.00	45.00	45.00	38.00
35.00	40.00	40.00	40.00	Italian, 220 lb bags NY...ton	40.00	50.00	50.00	40.00
.....	50.00	50.00	50.00	Refined, white, bags....ton	50.00	55.00	55.00	50.00
3.50	4.85	4.00	4.41	Tankage Ground NY.....unit	.....	5.00&10	5.10&10	5.10&10
3.10	5.25	3.75	4.29	High grade f.o.b. Chicago.unit	.....	3.90&10	3.90&10	3.90&10
.....	5.25	4.00	4.38½	South American cif.....unit	.....	5.00&10	4.95&10	4.95&10
.02	.04½	.04½	.04½	Tapioca Flour, high grade bgs.lb.	.04½	.05	.05	.04½
.01½	.03½	.03½	.03½	Medium grade, bags.....lb.	.03½	.04	.04	.03½
.....	.26	.26	.26	Tar Acid Oil, 15%, drums...gal.	.26	.27	.27	.26
.....	.29	.29	.29	25% drums.....gal.	.29	.30	.30	.29
.....	.07	.07	.07	Coke Oven, tanks wks.....lb	.07	.08	.08	.07
6.50	16.00	13.50	14.87½	Kiln Burnt, bbl.....bbl.	.....	13.50	13.50	13.50
6.76	18.50	13.50	15.38½	Retort, bbls.....bbl.	13.50	15.00	15.00	13.50
				Terra Alba Amer. No. 1, bags or				
.75	1.15	1.15	1.15	bbls mills.....100 lb.	1.15	1.75	1.75	1.15
.60	1.50	1.50	1.50	No. 2 bags or bbls...100 lb.	1.50	2.00	2.00	1.50
.80	2.00	2.00	2.00	Imported bags.....100 lb.	.02	.02½	.02½	.02
.....	.20	.20	.20	Tetralene, 50 gal drs wks.....lb.	.....	.20	.20	.20
.....	.22	.22	.22	Thiocarbanilid, 170 lb bbl.....lb.	.22	.24	.24	.22
				Tin Bichloride, 50% soln, 100 lb				
.11¼	.20½	.17½	.19	bbls wks.....lb.	.....	.16½	.17½	.16½
.23	.48	.41½	.45	Crystals, 500 lb bbls wks...lb.	.....	.40	.41½	.40
.....	.71½	.58	.65	Metal Straits NY.....lb.	.....	.58	.58	.58
.36	.75	.70	.71	Oxide, 300 lb bbls wks.....lb.	.....	.75	.75	.75
				Tetrachloride, 100 lb drs wks				
.....	.48	.35½	.39	.....lb.	.....	.34	.35½	.34
.....	.40	.40	.40	Titanium Oxide, 200 lb bbl...lb.	.....	.40	.40	.40
.....	.13½	.13½	.13½	Pigment, bbls wks.....lb.	.13½	.14	.14	.13½
1918	.40	.40	.40	Toluene, 110 gal drs wks.....lb.	.....	.40	.40	.40
.....	.35	.35	.35	8000 gal tank cars wks.....lb.	.....	.35	.35	.35
1918	.90	.90	.90	Toluidine, 350 lb bbls.....lb.	.90	.94	.94	.90
1918	.31	.31	.31	Mixed, 900 lb drs wks.....lb.	.31	.32	.32	.31
.....	.85	.85	.85	Toner Lithol, red, bbls.....lb.	.85	.90	.90	.85
.....	.75	.75	.75	Para, red, bbls.....lb.	.75	.80	.80	.75
1918	1.75	1.75	1.75	Toluidine.....lb.	1.75	1.80	1.80	1.75
.....	3.60	3.60	3.60	Triacetin, 50 gal drs wks.....lb.	3.60	3.90	3.90	3.60
.....	.36	.36	.36	Tricresyl Phosphate, drs.....lb.	.36	.50	.50	.36
.....	.70	.69	.69	Triphenylguanidine.....lb.	.69	.73	.73	.69
.....	.70	.70	.70	Phosphate, drums.....lb.	.70	.75	.75	.70
.....	2.50	2.50	2.50	Tripoli, 500 lb bbls.....100 lb.	2.50	3.00	3.00	2.50
.49	.86	.53½	.65	Turpentine Spirits, bbls.....gal.	.60	.62½	.62½	.60
.34	.76	.46	.55	Wood Steam dist. bbls....gal.	.50	.52½	.52½	.46
.....	.18	.18	.18	Urea, pure, 112 lb cases.....lb.	.18	.20	.20	.18
				Valonia Beard, 42%, tannin				
.....	70.00	66.00	61.52	bags.....ton	.....	Nom.	Nom.	Nom.
.....	49.50	39.00	43.96	Cups, 30-31% tannin.....ton	.....	Nom.	Nom.	Nom.
.....	68.00	43.00	48.52	Mixture, bark, bags.....ton	.....	Nom.	Nom.	Nom.
.55	1.95	1.55	1.94¾	Vermilion, English, kegs.....lb.	.....	1.95	1.95	1.95
.....	59.00	49.50	53.71	Wattle Bark, bags.....ton	.....	66.00	76.00	66.00
				Extract 55%, double bags ex-				
.....	.05¾	.05¾	.05¾	dock.....lb.	.....	Nom.	.05¾	.05¾
				Whiting, 200 lb bags, c-1 wks				
.45	1.25	1.25	1.25	.....100 lb.	.....	1.25	1.25	1.25
.....	13.00	13.00	13.00	Alba, bags c-1 NY.....ton	.....	13.00	13.00	13.00
.55	1.35	1.35	1.35	Gilders ,bags c-1 NY...100 lb.	.....	1.35	1.35	1.35
				Zinc Ammonium Chloride powd.,				
.....	.06½	.06½	06½	400 lb bbls.....lb.	.....	.05¾	.05¾	.05¾
.08½	.09½	.09½	.09½	Carbonate Tech, bbls NY..lb.	.09½	.10	.10	.09½
				Chloride Fused, 600 lb drs.				
.04½	.06	.06	.06	wks.....lb.	.....	.06	.06	.06
.04½	.06½	.06½	.06½	Gran., 500 lb bbls wks.....lb.	.06½	.06½	.06½	.06½
.....	3.00	3.00	3.00	Soln 50%, tanks wks...100 lb.	.....	3.00	3.00	3.00
.....	.40	.40	.40	Cyanide, 100 lb drums.....lb.	.40	.41	.41	.40
.05¼	.09	.09	.09	Dust, 500 lb bbls c-1 wks...lb.	.....	.09	.09	.09
				Metal, high grade slabs c-1				
.....	7.35	6.40	6.66	NY.....100 lb.	.....	6.40	6.40	6.40
.05½	.07½	.07½	.07½	Oxide, American bags wks..lb.	.07½	.07½	.07½	.07½
.06½	.10½	.10½	.10½	French, 300 lb bbls wks..lb.	.10½	.12½	.12½	.10½
.02½	.03½	03	.03½	Sulfate, 400 bbl wks.....lb.	.03½	.03½	.03½	.03½
.....	.30	.30	.30	Sulfide, 500 lb bbls.....lb.	.30	.32	.32	.30
.....	.29	.29	.29	Sulfocarbolate, 100 lb keg..lb.	.29	.30	.30	.29
.....	.38	32	.37	Xylene, 10 deg tanks wks....lb.	.....	.32	.32	.32
.....	.36	.30	.35	Commercial, tanks wks....lb.	.30	.32	.32	.30
1918	.35	.35	.35	Xylidine, crude.....lb.	.....	.38	.38	.38
.....	.02½	.02½	.02½	Zirconium Oxide, Nat. kegs..lb.	.02½	.03	.03	.02½
.....	.45	.45	.45	Pure kegs.....lb.	.45	.50	.50	.45
.....	.08½	.08	.08	Semi-refined kegs.....lb.	.08	.10	.10	.08

Oils and Fats

.08	.14	.13	.13	Castor, No. 1, 400 lb bbls....lb.	.14	.14½	.14½	.14
.08	.14	.12½	.13½	No. 3, 400 lb bbls.....lb.	.13½	.14	.14	.13½
.....	.18	.17	.18	Blown, 400 lb bbls.....lb.	.....	.17	.17	.17
.06½	.31	.13¾	.19	China Wood, bbls spot NY...lb.	.16½	.17	.17	.15½
.05½	.18	.12½	.16¼	Tanks, spot NY.....lb.	.....	Nom.	Nom.	Nom.
				Coast tanks, Jan.....lb.	.....	.14¼	.14¼	.13½
1918	.12	.12	.12	Cocoanut, edible, bbls NY....lb.	...	.11¼	.11¼	.11¼
.09½	.09½	.09	.09	Ceylon, 375 lb bbls NY....lb.	.09½	.10	.10	.09½
.08½	.08¾	.08	.08¼	8000 gal tanks NY.....lb.	.....	.08¾	.08¾	.08¾
.10½	.10½	.09½	.10	Cochin, 375 lb bbls NY....lb	.10¼	.10½	.10½	.10½

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Prices Current and Comment

Standard Purchasing Power of the Dollar: July 1914 $1.00 - Jan. 1927 68.7c - July 1927 71.7c - Jan. 1928 65.6c

Neatsfoot Oil — In common with the other members of the animal group, this oil has gradually declined in price since last reported due chiefly to increasing supplies and a reaction in sympathy with the Western market which is much easier. From the position as last reported, all grades have declined during the month so that cold test is now at 18⅝c lb., extra at 12¼c lb., and pure at 15¾c lb.

Oleo Oil — Here too there has been a gradual weakening so that during the course of the month there has been a decline of 1c lb. in all grades. No. 1 is now at 16¼c @ 16½c lb.; No. 2 at 14½c @ 14¾c lb. and No. 3 at 13½c lb.

Olive Oil — Denatured declined to $1.20 @ $1.25 gal. about the middle of last month and since then has been holding steady at that price. About the same time, foots also declined to 9½c lb. but the following week returned to 9⅝c lb. where it has remained since.

Palm Oil — This market has been weak during the past month, its decline following that of tallow. At the middle of January both Lagos and Niger declined in price, the former to 8c lb. and the latter to 7⅛c lb. During the following week, Niger advanced to 7¼c lb. where it has remained.

Perilla Oil —The downward price trend last reported, due to accumulated stocks at the cost, continued until about the middle of last month, resulting in a further decline in Coast tanks to 10¾c lb., which position it has held since.

Rapeseed Oil—All grades have advanced during the month. An advance to 88c lb. of English occurred at the middle of last month and the price has not changed since. During the following week Japanese advanced to 84c @ 85c lb. which was later followed by a further advance to 85c @ 87c lb. This is attributed to existing scarcity coupled with an icrease in demand. At the time of this latter increase in Japanese, blown oil also advanced to $1.04 @ $1.06 lb.

Stearine Oleo — Has declined during the month from 10¼c lb. to 9⅞c lb.

Tallow — The past month witnessed a break in the tallow market which had reached its price peak when last reported. The original decline in price was attributed to that fact that a few who had accumulated large supplies of a rather inferior grade were left with them when soapmakers suddenly stopped buying. Further decline in prices which followed, however, seem to be in sympathy with the Western market which is easier. It is now quoted at 8¾c @ 8⅞c lb., at which price it seems likely to be steady. Edible tallow also declined to 10¼c @ 10c½ lb.

1914 July	1927 High	1927 Low	1927 Aver.			Current Market	1928 High	1928 Low
.05½	.10	.08½	.09½	Tanks NY	lb.	.....	.09¾	.09¾	.09¾
.....	.09¼	.08½	.09¼	Manila, bbls NY	lb.	.09¼	.10	.10	.09¾
.....	.08¾	.08¼	.08⅝	Tanks NY	lb.	.....	.08¾	.08¾	.08¾
.....	.08¼	.08	.08¼	Tanks, Pacific Coast	lb.	.08¼	.08¾	.08¾	.08¾
				Cod, Newfoundland, 50 gal bbls					
.36½	.66	.63	.64½		gal.	.63	.65	.65	.63
.36½	.59	.59	.59	Tanks NY	lb	.62	.63	.63	.62
				Cod Liver see Chemicals					
1918	.06	.06	.06	Copra, bags	lb.	.06	.06½	.06¼	.06
.06½	.11	.07	.10	Corn, crude, bbls NY	lb.	.....	.11	.11	.11
.06½	.09¾	.07	.08¼	Tanks, mills	lb.	.10	.10	.10	.08¾
1916	.14	.10½	.12	Refined, 375 lb bbls NY	lb.	.....	.12¾	.12½	.12½
1916	.12	.11	.11	Tanks	lb.	.....	.11¾	.11½	.11½
.06	.09½	.06¼	.08	Cottonseed, crude, mill	lb.	.08	.08	.09	.08
.07½	.11½	.08 1/5	.10	PSY, 100 lb bbls spot	lb.	.....	.10	.10¼	.10
				Mar.—May	lb.	9.90	9.90	10.45	9.90
				Degras, American, 50 gal bbls					
.02½	.04½	.04½	.04½	NY	lb.	.04½	.04½	.04½	.04½
.03½	.04¾	do	do	English, brown, bbls NY	lb.	.04¾	.04¾	.04¼	.04¾
.03½	.05½	.05½	.05½	Light, bbls NY	lb.	.05½	.05½	.05½	.05½
.04½	.07½	.06	.06⅜	Greases, Brown	lb.	.07½	.07½	.07½	.07½
.05½	.08	.06½	.07½	Yellow	lb.	.07½	.08	.08	.07½
.06½	.10½	.08½	.09⅜	White, choice bbls NY,	lb.	.10	.10½	.10½	.10
.....	.....	.....	.....	Herring, Coast, Tanks	gal.	.40	Nom.	Nom.	.40
.009	.09½	.09	.09⅛	Horse, bbls	lb.	.09½	Nom.	Nom.	.09½
.13	.16¾	.14¾	.15½	Lard Oil, edible, prime	lb.	.....	.15¾	.15¾	.15¾
.....	.13¼	.10¾	.12	Extra, bbls	lb.	.....	.13	.13	.13
.09	.12½	.10⅛	.11½	Extra No. 1, bbls	lb.	.....	.12	.12¼	.12
.09½	.13¾	.12½	.13⅛	Off prime, bbls	lb.	.....	.13¼	.13¼	.13¼
.078	.11 4/5	.10 2/5	.11	Linseed, Raw, five bbl lots	lb.	.....	10.4	10.4	10.0
.077	.11 9-10	.09 6-10	.10⅛	Bbls c-l spot	lb.	.....	10.0	10.0	9.6
.076	.10½	.09	.09 7-12	Tanks	lb.	.....	9.2	9.2	8.8
.....	.09¾	.09¼	.09¾	Lumbang, Coast	lb.	.....	.09¾	.09¼	.09¾
.33½	.47½	.44	.46⅝	Menhaden Tanks, Baltimore	gal.	.....	Nom.	.46	.46
.....	.90	.10	.36⅜	Blown, bbls NY	lb.	.....	.09	.09	.09
.43	.70	.67	.68½	Extra, bleached, bbls NY.	gal.	.67	.68	.68	.67
.39	.66	.63	.62	Light, pressed, bbls NY	gal.	.63	.64	.64	.63
.37	.66	.69	.67½	Yellow, pressed, bbls NY	gal.	.66	.67	.67	.66
				Mineral Oil, white, 50 gal bbls					
					gal.	.40	.60	.60	.40
				Russian, gal	gal.	.95	1.00	1.00	.95
.14	.18¾	.14½	.17½	Neatsfoot, CT, 20° bbls NY	lb.	.....	.18½	.18¼	.18½
.....	.13½	.10½	.12	Extra, bbls NY	lb.	.....	.12½	.12½	.12½
.....	.16¼	.12½	.14½	Pure, bbls NY	lb.	.....	.15¼	.16¼	.15¼
.08	.18½	.10	.13¾	Oleo, No. 1, bbls NY	lb.	.16½	.16½	.17¼	.16½
.07½	.17	.08¾	.12	No. 2, bbls NY	lb.	.14½	.14¾	.15½	.14¾
.07½	.14	.08¼	.10½	No. 3, bbls NY	lb.	.....	.13½	.14	.13½
.83	1.75	1.40	1.48½	Olive, denatured, bbls NY	gal.	1.20	1.25	1.30	1.20
1918	2.00	2.45	2.15	Edible, bbls NY	gal.	1.90	2.00	2.00	1.90
.07½	.10½	.08¼	.09⅛	Foots, bbls NY	lb.	.09¼	.09¼	.09¼	.09¼
.08¼	.09½	.09	.09½	Palm, Kernel, Casks	lb.	.....	.09½	.09¼	.09¼
.07	.08¾	.07½	.08	Lagos, 1500 lb casks	lb.	.08	.08	.08¼	.08
.....	.08¼	.07½	.07½	Niger, Casks	lb.	.07½	.07½	.07¾	.07½
.....	.14½	.12	.12	Peanut, crude, bbls NY	lb.	.12	.12½	.12½	.12
.....	.15½	.14½	.15	Refined, bbls NY	lb.	.14½	.15	.15	.14½
.....	.16½	.12½	.14	Perilla, bbls NY	lb.	.13	.13½	.13½	.13
.....	.14½	.10	.12	Tanks, Coast	lb.	.10½	.10½	.11	.10½
.....	1.70	1.70	1.70	Poppyseed, bbls NY	gal.	1.70	1.75	1.75	1.70
.63	1.05	1.00	1.01	Rapeseed, blown, bbls NY	gal.	1.04	1.06	1.06	1.01
.....	.90	.82	.87	English, bbls NY	gal.	.....	.88	.88	.87
.....	.85	.76	.80⅝	Japanese, bbls NY	gal.	.85	.87	.87	.82
.06½	.10	.09	.09	Red, Distilled, bbls	lb.	.09½	.10	.10	.09½
.....	.09½	.08½	.08⅝	Tanks	lb.	.09	.09½	.09½	.09
.....	.50	.50	.50	Salmon, Coast, 8000 gal tks	gal.	.50	Nom.	Nom.	.50
.....	.47	.43	.45	Sardine, Pacific Coast tks	gal.	.....	.45	.45	.45
.08½	.13	.11½	.12½	Sesame, edible, yellow, bbls	lb.	.....	.13½	.13½	.13½
.....	.14	.14	.14	White, bbls	lb.	.14	.15	.15	.14
.34	.40	.40	.40	Sod, bbls NY	gal.	.....	.40	.40	.40½
.....	.09¾	.09½	.09¾	Soya Bean, crude					
.06½	.....	.....	.....	Pacific Coast, tanks	lb.	.....	.09¾	.09¾	.90
.....	.12½	.10¾	.12	Soya Bean, crude, bbls NY	lb.	.12	.12½	.12½	.12
.....	.11	.10½	.10½	Tanks NY	lb.	.....	10½	.10½	.10½
.....	.13	.12	.13	Refined, bbls NY	lb.	.....	.13½	.13½	.13½
				Sperm, 38° CT, bleached, bbls					
.70	.85	.84	.84½	NY	gal.	.84	.85	.85	.84
.68	.82	.79	.80½	45° CT, bleached, bbls NY	gal.	.79	.80	.80	.79
				Stearic Acid, double pressed dist					
1916	.13½	.11½	.12	bags	lb.	.11½	.12	.12	.11½
				Double pressed saponified bags					
1916	.14	.11½	.12		lb.	.11¾	.12½	.12½	.11¾
1916	.15½	.13½	.14	Triple, pressed dist bags	lb.	.13½	.14	.14	.13½
.07½	.13	.08¾	.11	Stearine, Oleo, bbls	lb.	.....	.09¾	.10½	.09¾
.06	.09	.07½	.08	Tallow, City, extra loose	lb.	.08¾	.08¾	.09½	.08¾
.07	.11	.08¼	.10	Edible, tierces	lb.	.10¼	.10½	.10¾	.10¼
.09	.10¾	.08½	.10	Tallow Oil, Bbls, c-l NY	lb.	.....	.11¼	.11¼	.11½
.09½	.12½	.10	.11	Acidless, tanks NY	lb.	.....	.10¾	.10¾	.10¾
.....	.08½	.07½	.07¾	Vegetable, Coast mats	lb.	.08	Nom.	Nom.	.08
.04¾	.11	.11	.11	Turkey Red, single bbls	lb.	.11	.12	.12	.11
.05½	.14	.14	.14	Double, bbls	lb.	.14	.16	.16	.14
				Whale, bleached winter, bbls					
.50	.78	.78	.78	NY	gal.	.78	.80	.80	.78
.52	.80	.80	.80	Extra, bleached, bbls NY	gal.	.80	.82	.82	.80
.48	.76	.76	.76	Nat, winter, bbls NY	gal.	.76	.78	.78	.76

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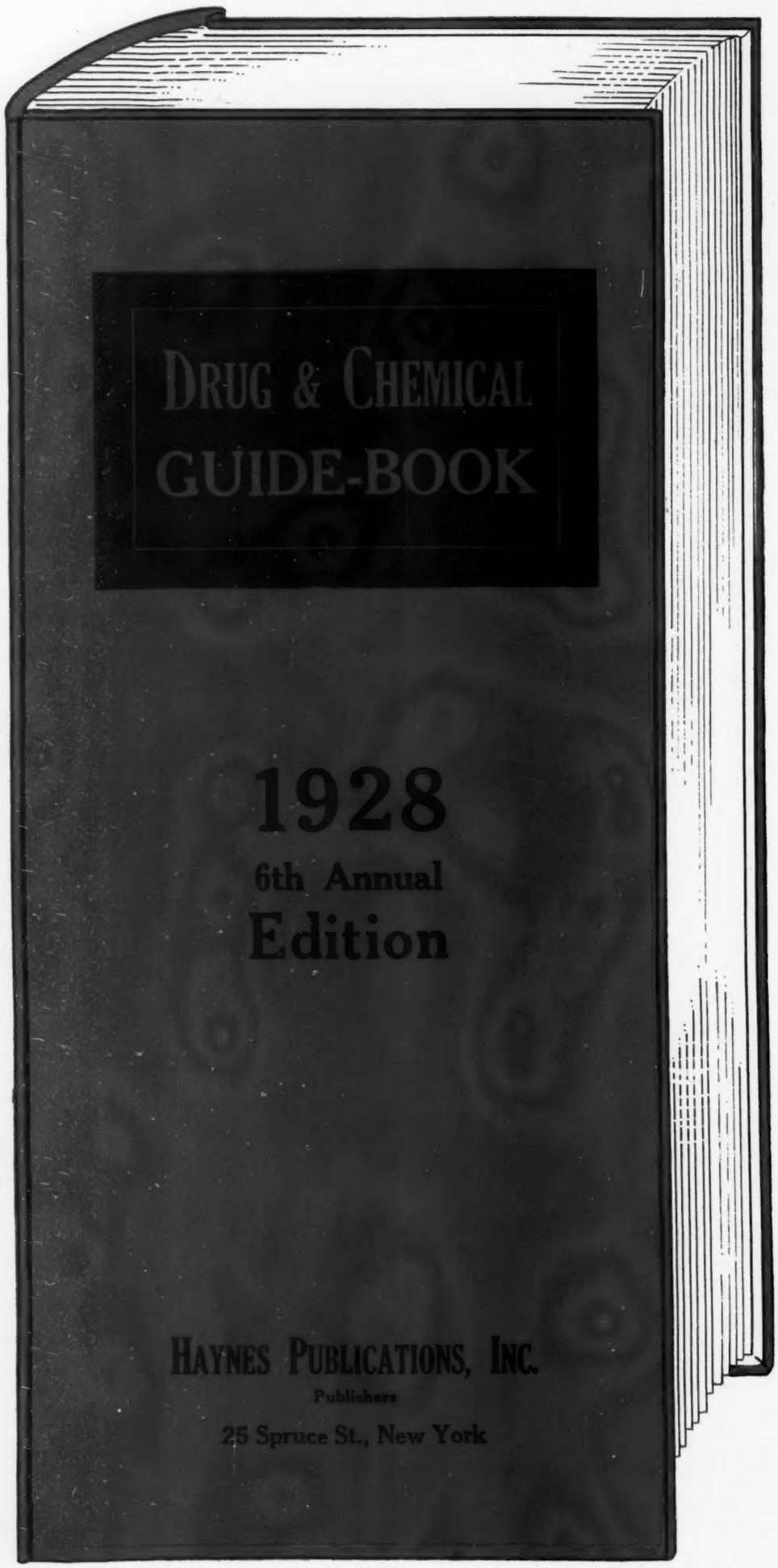

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LOS ANGELES

Conditions in the chemical industry on the Pacific Coast have been quite satisfactory since the turn of the year. While there has not been any outstanding movement of stock during this period, the total sales volume is good. The price of carbon tetrachloride is more stabalized at the moment. Otherwise there have not been any fluctuations in prices. Collections are fair.

BOSTON

General business conditions in the Boston territory have been good since the first of the year. While most items have been moving fairly well and there is no outstanding movement of note, there has been a decided lack of business in glauber salts and denatured alcohol. During the period under report there have not been any price changes worthy of comment. Collections are good.

DETROIT

Conditions in general and in the chemical industry are showing steady signs of improvement in the Detroit territory. The automobile industry has been going better with a resulting picking up in allied trades. There has not been any outstanding movement of chemical items nor have there been any notable price changes. Collections are better at the moment and can be classed as very good in this territory.

KANSAS CITY

Business in this territory during the early weeks of the year has been good. Inquiries have been very brisk and considerable business has been closed. Cold weather has stimulated the demand for alcohol and practically all excess stocks have been removed from sellers hands. The situation on alcohol is therefore quite firm and prices are well maintained. Since the early rush there has been a slackening off in business in all items and demand is rather routine at the moment. The principal features of the market are the strength of alcohol and blue vitriol and the weakness of glycerin. There has been a notable delay in the shipments of copperas on order.

NEWARK

There is a decided improvement in the machinery and metal working concerns in this territory. Employment is better and in general business points toward

Massachusetts

Rogers & McClellan
New England Agents
Seaboard Chemical Co.
Denatured Alcohol Wood Alcohol
Methyl Acetone
Franco-American Chemical Wks.
Amyl Acetate Pyroxylin Solutions
Atlantic Carbonic Co.
Glauber Salts Bisulphite Soda
Penn Chemical Works
Lye
Battelle & Renwick
Sulphur Saltpetre

DOE & INGALLS, INC.
196 MILK STREET
BOSTON
Hancock 8540
PYROXYLIN
LACQUERS—DOPES—SOLVENTS

CEMENTS
Waterproofing
HOWE & FRENCH
Established 1834
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ACIDS
CHEMICALS
DYESTUFFS
for all industrial purposes
Eaton-Clark Company
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204 Woodward Ave.,
DETROIT, MICH.
Branch: Windsor, Ont.

Missouri

THOMPSON-HAYWARD CHEMICAL CO.
Kansas City St. Louis
Des Moines, Iowa Houston, Tex.
CHEMICALS, OILS & DRUGS
Manufacturers Sales Representatives to the Jobbing and Manufacturing Trade
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The Middle West and Southwest

Local Reports *from our Correspondents at the Principal Consuming Centers of Industrial Chemicals*

Missouri---(cont.)

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ST. LOUIS
Br. Off:—1408 Sanger Avenue
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MATHIESON
Liquid Chlorine-Caustic Soda-Soda Ash
Bleaching Powder-Anhydrous Ammonia
Modified Virginia Soda-Bicarbonate of Soda

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MINERAL ACIDS
INDUSTRIAL CHEMICALS
ALCOHOLS - SOLVENTS
AMERICAN
OIL & SUPPLY CO.,
238 Wilson Ave., Newark, N. J.
289 N. Willow St., Trenton, N. J.

New York

Western New York Headquarters for
CHEMICALS and
RAW MATERIALS
ROLLS CHEMICAL COMPANY
Ellicott Sq. Bldg., Buffalo

DANITRA BRAND
Double Refined
SALTPETRE and
NITRATE OF SODA
U. S. P.
Manufactured by
DAVIES NITRATE CO., INC.
57-59 Commerce St., Brooklyn, N. Y.

better conditions throughout the first three or four months of this year. Dry color manufacturers report a very material increase in production of from 10 to 30 per cent. over January 1927. Sales are small but frequent. The leather trade reports only fair conditions prevailing, but all factors are of the opinion that business is better than for the corresponding period last year. Textiles are dull to fair. There are still a large number of failures among the smaller silk manufacturers. At the moment there is more silk being produced than there is a demand for. There is a lack of co-operation among the various producers and not much improvement is looked for in the near future. While an improved condition reported, it is slight and there is not the business that was anticipated. However this industry is in a better position and continued improvement is looked for.

CLEVELAND

Business in the Cleveland district has improved somewhat since the turn of the year, but has been rather quiet for the past ten days. Paint manufacturers selling to the trade have been busy. However, there have been no serious complaints and everyone seems optimistic for the future. There have been price changes of importance since the first of the year.

ST. LOUIS

Immediately following the beginning of the year, business took a sudden spurt, as was to be expected in view of depleted stocks. The spurt did not last long however and business generally during the month of January was slightly behind the same month of last year. This is apparently in line with the predictions that a decided betterment in business would not be apparent until early spring. In view of the open weather, farmers are already beginning to inquire for agricultural chemicals, although active shipments cannot be expected for another month or six weeks. Due to the presence of a new factor, who is refining sulfur in St. Louis there has been a small fight on in an effort to book all available sulfur business on contract. No material market changes have been apparent however. In the face of a weak tin market, the price of Tin Oxide has declined another 2c lb. coming down to a 60c level. There have been no other important changes. Collections are not as good as they were the latter part of 1926, but may still be considered fair.

Ohio

COLORS
LACQUER SOLVENTS
TOLUOL BENZOL
ALCOHOL GLYCERINE
Henry L. Grund Co.
Bulkley Bldg.
CLEVELAND, OHIO

OILS
HYDROXY TEXTILE
SULPHONATED CASTOR
50 and 75%
All Sulphonated Oils and Finishing Compounds
AMMONIA ACETIC ACID
FORMALDEHYDE
Kali Manufacturing Co.
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We carry warehouse stocks of domestic and imported industrial chemicals
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Chemicals, Glycerin, Blanc Fixe

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MANN
& CO., INC.
Providence, Rhode Island
SODA ASH
CAUSTIC SODA
SODIUM SULFIDE
CALCIUM CHLORIDE
AMMONIA
STEARIC ACID

Church & Dwight, Inc.

Established 1846

80 MAIDEN LANE NEW YORK

Bicarbonate of Soda

Sal Soda

Monohydrate of Soda

Standard Quality

Synthetic Organic Chemicals

Over 2300 Eastman Organic Chemicals are kept *in stock* for your convenience.

Write today for List No. 17 which gives definite specifications for most of the chemicals listed.

Eastman Kodak Company

Research Laboratories Rochester, N. Y.

Chemical Imports

January Imports at New York

ACETYL CELLULOSE—2 cases
ACIDS—
CHROMIC—11,450 lbs.
CRESYLIC—65,483 lbs. and 147 casks.
FORMIC—114,914 lbs.
TANNIC—2,550 lbs.
ALBUMEN—
EGG—32,800 lbs. and 175 cases.
ALCOHOL
DENATURED—44,000 lbs
ISOPROPYL—40,858 lbs.
ALUM
POTASH—250 casks.
ALUMINUM
HYDRATE—25 casks.
AMMONIUM
CARBONATE—22,000 lbs.
CHLORIDE—59,180 lbs.
MURIATE—216,614 lbs.
NITRATE—410 bags.
PERSULFATE—8,470 lbs.
SULFATE—1,995,400 lbs.
THIOCYANATE—5 kegs.
ANTIMONY
CRUDE—66,000 lbs.
OXIDE—112,500 lbs., 540 casks and 500 bags.
REGULAS—418,297 lbs.
SULFIDE—211 sacks.
ARSENIC
CRUDE—436 cases.
REFINED—209 bags.
SULFIDE—1,346 lbs.
BARIUM
CHLORIDE—180,316 lbs., 280 bags and 56 cases.
NITRATE—81,900 lbs.
SULFIDE—2,501 lbs.
BARYTES—3,477,000 lbs. & 250 bags.
BEESWAX—20,931 lbs., 50 bbls. and 583 bags.
BENZYL CELLULOSE—1 cask.
BONE MEAL—333,660 lbs. and 3,941 bags.
BORAX—1 keg and 1 case.
BUTYL ACETATE—43,638 lbs.
BUTYLAMINE—284 lbs.
CALCIUM CHLORIDE—510,400 lbs.
OXIDE—50 bbls.
CAMPHOR
SYNTHETIC—113,518 lbs. and 350 cases.
CANDELILLA WAX—15 sacks.
CASEIN—7,319,391 lbs. and 5,995 bags.
CHALK—3,963,100 lbs. and 5,750 bags and 10 cases.
CHEMICALS—444,862 lbs. and 276 drums, 1,162 casks, 5 bottles, 234 cases, 73 pkgs, 5 cylinders.
CHEMICAL MANURE—22 bags.
CHROME
ALUM—20 kegs.
OXIDE—4,934 lbs.
CINNEBAR ORE—1,806 lbs.
COLORS—159 casks.
ALIZARIN—6,899 lbs, 146 casks, 5 jugs
ANILINE—1,875 lbs. 35 cases and 32 bbls.
COAL TAR—8,148 lbs, 252 casks and 22 jugs.
MINERAL—15 bbls.
ULTRA MARINE—2,200 lbs.
CREOSOTE—8,004 tons and 1 case.
CYANIDE PRECIPITATES—2 cases.
DECOLORIZING CARBON—28,118 lbs.
DEXTRIN—440 lbs.
DIETHYL SULFATE—546 lbs.
EGG YOLK—64,800 lbs.
EPSOM SALT—120,461 lbs.
ETHYLENE BROMIDE—2,704 lbs.
EXTRACTS
FERTILIZER—2,296,800 lbs.
GELATIN—70 bbls., 5 kegs and 65 cases.
GLAUBER'S SALT—564,300 lbs.
GLUE—72 casks, 384 bales, 863 bags.
GLYCERIN—251,328 lbs. and 130 drums.
GREEN OXIDE—4 casks.
GUMS—102,286 lbs. 150 bags and 30 casks.
ARABIC—14,034 lbs.
COPAL—79,502 lbs., 1964 bags, 4,519 baskets and 100 cases.
DAMAR—329,775 lbs., 4,741 bags and 442 cases.
KAURI—563 pkgs.
GYPSUM—6,000 tons.
HYDROSULFIDE—7,392 lbs.
INDIGO—44 casks.
IRON
CHLORIDE—48,843 lbs.
OXALATE—3,600 lbs.
OXIDE—76,908 lbs., 108 bbls. and 20 kegs.
RED—215 lbs.
JAPAN WAX—200 cases.
KAINIT—1 case.
LAMP BLACK—220,090 lbs.
LEAD NITRATE—4,851 lbs.
LITHOPONE—2,450 casks.
MAGNESIA—
CALCINED—216 cases.
MAGNESITE—1,003,124 lbs.
MAGNESIUM
CARBONATE—2,907 lbs.
CHLORIDE—180,822 lbs.
OXIDE—3,341 lbs.
MERCURY—49,214 lbs.
METHANOL—471,336 lbs.
MOLASSES—1,489,749 gals. and 150 bbls.
NAPHTHALENE—371,294 lbs.
NICKEL SULFATE—100 cases.
NITRATE PHOSPHATE—363 bags.
NITROGENOUS FERTILIZER—244,772 lbs. and 1,500 bags.
OILS
CHINAWOOD—500 drums.
COCOANUT—8,299,939 lbs., 37 hogsheads and 3 cases.
COD—79,475 gals. and 1 case.
OLEO—90 tierces.
OLIVE—259,910 gallons.
SULFUR OLIVE—76,260 gals.
PALM—1,983 623 lbs. and 135 drums.
KERNEL—295 lbs.
RAPESEED—773 drums.
SOYBEAN—679 tons.
WHALE—20,733 lbs.
PHOSPHOROUS SESQUISULFIDE—9,724 lbs.
PHOSPHATE—439,929 lbs.
POTASH—
CARBONATE—164,171 lbs.
CAUSTIC—426,288 lbs. and 35 cases.
CHLORATE—322,228 lbs.
CHLORIDE—150,711 lbs.
CYANIDE—2,486 lbs.
MURIATE—602,844 lbs. and 1,950 bags.
NITRATE—510,614 lbs.
PERCHLORATE—10,348 lbs.
PRUSSIATE—4,785 lbs. and 90 kegs.
PYRITES—10,619,664 lbs.
RED OXIDE—334,136 lbs.
ROSIN—51,368 lbs.
ROTTENSTONE—40 cases, 710 casks.
SALT—60 tons.
EFFERVESCENT—400 cases.
SALTPETER—55,400 lbs.
SODIUM
ACETATE—4,785 lbs.
CHLORATE—15,250 lbs. and 30 drs.
CYANIDE—1,320 cases and 940 casks.
FERROCYANIDE—25 cases.
NITRATE—10,442,902 lbs. and 44,185 bags.
PHOSPHATE—187,587 lbs. and 80 kegs.
PRUSSIATE—60 casks.
PYROSULFATE—116,600 lbs.
SULFIDE—24,785 lbs. and 33 drums.
SHELLAC—15,506 lbs., 7,920 bags and 7,230 chests.
SILVER SULFIDE—216 packages.
TALC—2,470,387 lbs.
TANKAGE—110,017 lbs.
TAPIOCA FLOUR—1,294,677 lbs. and 6,981 bags.
TARTAR CREAM—78,942 lbs.
CRUDE—174,376 lbs.
TARTRATE-LIME—463,443 lbs. and 456 bags.
THORIUM NITRATE—10,896 lbs.
UMBER—11,485 lbs.
UREA—31,497 lbs.
VEGETABLE WAX—20 bags.
WHITE, MINERAL—100 casks.
WOOD TAR—374,197 lbs.
ZINC OXIDE—66,850 lbs., 65 casks and 225 lbs.
SULFATE—96,071 lbs.

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THREE times a week--Monday, Wednesday and Friday--you can now secure a complete confidential bulletin on chemical and drug imports and exports at all the important American ports. This service gives you the product, packing, weight, port of origin, ship, and the consignee, if shown on manifest. It is mailed under sealed, first-class mail---if time is a special consideration for a fee to cover extra postage it will be sent to you "special delivery" or "air mail." For your convenience this service is divided into four parts:

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Covering heavy and fine chemical raw materials, dye and tan stuffs, pigments, fillers, sizes, naval stores, insecticide and fertilizer raw materials.

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Covering all the animal, vegetable, and fish oils, fats, greases and fatty acids.

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Covering roots, barks, leaves, berries, flowers, etc., gums and waxes, and all the spices.

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Covering essential oils and aromatic chemicals, compounds, and other perfume and flavor materials.

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Address .....

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Technical Chemicals:
Ammonium Nitrate
Barium Chloride
Calcium Nitrate
Sodium Acetate
Sodium Nitrate
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SODIUM SULPHIDE
FUSED AND BROKEN
Mfgd. by
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"CROW BRAND"
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FORMIC ACID
90%
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ACETONE ACETONE OIL
METHYL ETHYL KETONE
Mfgd. by
Norwich Chemical Co., E. Smethport, Pa.

BUTYL PROPIONIATE TRIPHENYLPHOSPHATE
Mfgd. by
Chemical Products Corp., W. Nyack, N. Y.

European Representatives
R. W. Greeff & Co. Ltd., London, England

Cellulose And Chemicals

(*Continued from page 180*)

Great progress has been made in protecting forests and forest lands from fire. Each year as more difficult economic conditions justify the expenditure of funds necessary for the protection of forests from fire we come a little nearer to the ultimate goal in protection —that is, the making of the forest an insurable risk. Practical organization and management in fire protection will in time largely eliminate fire as a deterrent factor in the production of new forests.

The taxing of growing forests on an annual basis is wrong and is manifestly unfair to the timberland owner. The farmer's growing crops are not taxed. Until this wrong method of taxing timberlands on an annual basis can be changed we can expect that virgin forests will be cut as they have been in the past, and that the land owner will not assume the burden of producing a new crop to be taxed annually. Considerable progress has been made in overcoming the deterrent factor of wrong taxation of the forest. A number of states have passed laws which make it possible for the timberland owner to declare his lands as forest land and thereby have them assessed at a low land or soil value with a yield tax to be paid when the crop is cut.

While the forests of the country are being steadily overcut and while we will probably continue to cut our virgin forests in the old way until they are exhausted, yet real progress has been made in the protection of the forests from fire and in the direction of putting forest lands onto the right basis of taxation. These improved conditions have resulted in such interesting accomplishments as more timber standing and growing in New England to-day than there was 50 years ago. While it is quite possible that conditions may have to become worse before they become better, yet the forest situation is not at all an impossible one and there is every reason to believe that from now on every decade will see more rather than less forest growing in this country.

I. G. chemists are working on synthetic production of sugar by taking from the air component parts of sugar, such as carbon, oxygen and hydrogen and combining them; a chemist, John Gerson, in Rio de Janeiro announces that he has discovered a method for producing synthetic silver; the problem of using profitably the excess of sulfite lye and lumber refuse obtained in manufacture of chemical pulp is said to be solved by a Swedish engineer who invents a method of producing a first class fuel from the waste material; and Canadian chemists are working on a method for deriving alcohol from cellulose, using wood, straw, nisal waste and sawdust as raw materials.

December shipments of domestic water softeners, as reported by twenty-one manufacturers to the Department of Commerce, were 1,106 units, with a net sale price of $128,986, as compared with 1,414 units in November with a net sale price of $157,243, and 1,015 units in December, 1926, with a net sale price of $151,961. The total shipments in 1927 numbered 18,118 units and were valued at $2,287,660, as compared with 17,355 units valued at $2,356,335 in 1926.

CHEMICAL
E.C.KLIPSTEIN AND SONS CO.
MANUFACTURERS

SULPHUR BLACK

Dinitrophenol — Dyestuffs
Beta Methyl Anthraquinone
Aluminum Chloride (Sublimed / Anhydrous)
Anthraquinone — Soda Hyposulphite

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Prompt Delivery — *Attractive Prices*

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Iron Acetate
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WM. S. GRAY & CO.
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Vanderbilt 0500 Cables: Graylime

Acetate of Lime

Acetone

Denatured Alcohol

Methanol

Magnesium Carbonate

Formaldehyde

Magnesium Oxide

Phenol

Whiting

Chlor Phenols

Benzol

Sulphuryl Chloride

Thionyl Chloride

pH Control in Chemical Industry

(*Continued from page 176*)

a harmful effect, in that it tends to cause corrosion of the equipment and lower the quality of the paper. Various mills maintain pH values ranging from 4.2 to 7.0 in the beaters but this is a factor which must be determined for each individual mill, as conditions vary considerably and the optimum pH value is affected by a number of factors, such as hardness of water, degree of sizing, etc.

pH control also aids in the recovery of valuable materials from the white water. Where coagulation is used the pH value maintained by most mills is between 4.0 and 5.0. Here too the optimum may vary. Campbell showed that the sticking of pitch to the wire, press rolls and felts can be prevented by adding alum until a pH of 4.3 is obtained. Roschier showed that pH has a great influence on the retention of fillers; the retention increases rapidly from pH 4.0-5.6, but remains constant between 5.6 and 7.0.

Dyes and Pigments

Actual experience of many manufacturers has shown that not only can the yields of dyes and pigments be increased by regulating the pH of the solutions of the intermediates, but, what is often of more importance, that the shade can be checked in different batches. For example, it is well known that it is very difficult to produce successive batches of Para Red which have the same shade. This is now being accomplished on a large scale, by the use of hydrogen ion control. The same is true of many other pigments and dyes.

In the wet processing of silk and wool their acid or basic natures predominate, according to the relative acidity or basicity of the solutions in which they are immersed. Both possess definite neutral, or isoelectric, points, at which hydrogen ion concentrations their solubility and chemical reactivities are reduced to a minimum. Damage to these fibres increases progressively as the hydrogen ion concentration of baths in which they are treated become farther and farther from the isoelectric point. For practical purposes, the neutral zone is between pH 4.0 and 5.0.

Acid dyeings are commonly made in baths as acid as pH 1.5 without appreciable damage to the fibres, while, on the other hand, the alkalinity of neutral soap (pH 9.0 to 10.0) used for scouring wool and degumming silk deteriorates the fibres very little. Liability of damage increases very rapidly as the pH increases above 10.0, especially when the temperature is maintained at or near the boiling point. In the preliminary silk soaking process, calling for an emulsion of oil in water, the pH of the emulsion is important for the stability of the emulsion, its effectiveness on the silk, and for its relation to the tinting of the silk by the fugitive dyes present.

Scouring wool and degumming silk require an alkalinity of pH 10.0 to be effective. The correct pH

(*Continued on page 226*)

THE TAR ACID REFINING CORPORATION

With Sales Offices at

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OFFERS FOR PROMPT SHIPMENT

CRESYLIC ACID

HIGH BOILING TAR ACID

OF GRAESSER-MONSANTO MANUFACTURE

The uniformity of successive shipments, in both color and odor, has invariably commanded the preference of leading manufacturers.

Made by the GRAESSER-MONSANTO CHEMICAL WORKS, Ltd., Ruabon, N. Wales
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Sulphuric Acid

60° and 66° Commercial
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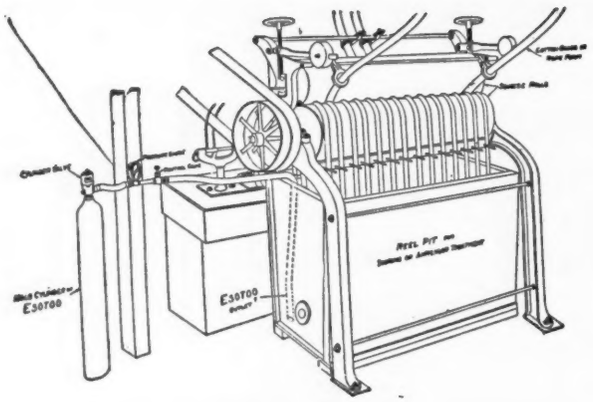

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If interested in SO_2 write for our booklets on the chemical and physical properties of this interesting and widely useful chemical. They may suggest new processes or new products for your plant in the practical development of which our Research Department stands ready to assist you.

VIRGINIA SMELTING CO.

Largest American Producers SO_2

F. A. EUSTIS, *Secretary*

Boston New York Norfolk

pH Control in Chemical Industry

(*Continued from page 224*)

in bleaching wool and silk with peroxide, and cotton with hypochloride solutions, has been emphasized by work done in many mills. Considerable work has also been done on the influence of pH on dyeings of silk and wool, and, it has been shown that affinity of the animal fibres for acid dye increases with decreasing pH values (best at pH 2.0 or less) while the opposite holds true for basic colors. In the latter case, although the optimum lies above pH 11.0, it is obviously out of the question to make dyeings at this alkalinity.

General Chemicals

pH control is important in the manufacture of such chemicals, as sodium carbonate and bicarbonate, primary and secondary sodium phosphates, aluminum sulfate, etc. For example, in the manufacture of phosphates by the action of sodium hydroxide on phosphoric acid, the pH value of the mixture increases slowly until the first hydrogen is neutralized. The addition of a very small additional amount of caustic raises the pH one whole unit, for example, from 4.0 to 5.0. At this point the mixture contains only primary sodium phosphate. If, after this point is reached, additional soduim hydroxide is added, the pH again increases slowly until the second hydrogen is neutralized. Again the addition of a very small amount of caustic causes the pH to rise suddenly. This means that the solution now contains only secondary sodium phosphate. By determining these break points and always maintaining these values, uniform products of high quality are obtained.

The presence of potassium bitartrate in potassium antimonyl tartrate can be shown by a pH determination. A 1 to 20 solution of a pure preparation has a pH of 4.1, but 1% of bitartrate lowers the pH to 3.4. If the minimum pH is therefore set at 4.0, the presence of more than 0.3% potassium bitartrate is excluded.

Similar tests detect free sulfuric acid in various sulfates. It is essential that zinc sulfate be free from traces of acid when the salt is used in eye treatment. Kolthoff states that if a 1 to 20 solution has a pH of 4.6, it will contain less than one part of sulfuric acid in 200,000. If a one to 10 solution of copper sulfate has a pH of not less than 4.0, the presence of one part of free sulfuric acid in 2000 is ruled out. When a 1 to 20 solution of alum (aluminum sulfate) has a pH of 3.2, the presence of more than one part of sulfuric acid in 1000 is excluded.

Other Applications

The above will give some idea of the wide application of pH control. Space will not allow us to discuss other processes but the method is just as useful in the manufacture of leather, glucose, corn sugar and candy, fruit, jellies, flour, bread and dough, crackers, and pharmaceuticals, and in ceramics, differential ore flotation, nickel and zinc electroplating.

Oxalic Acid

MANUFACTURED BY
OLDBURY - ELECTRO CHEMICAL CO. NIAGARA FALLS, N. Y.

Persulphate Ammonia

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NORTH AMERICAN CHEMICAL CO., BAY CITY, MICH.

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PURE and DENATURED

Tank Cars—Drums—Barrels

METHANOL **FUSEL OIL**

ACETIC ACID **C. P. ACETONE**

ACETATE OF LIME **METHYL ACETONE**

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Here You Have It

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STENCIL MACHINE

Graduated Table, Handle Adjustable to two positions, Rapid Stroke and Other Features. Cuts ⅛" and ¼" Letters.

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The Bradley Ball Stencil and Marking Pot.

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Italy—A New Chemical Factor

(*Continued from page 169*)

These numbers do not include the imports and exports for artificial silks and textiles, metals and papers.

Although these statistics show that the revaluation of the lira has not had much effect on the efficiency of the Italian chemical industry. it does show that Italy has a long way to go if she wishes to be completely independent of foreign chemical materials and to assume a high place as a producer.

The Industry's Problems

Two principle difficulties block the development of the Italian chemical industry: a scarcity of raw materials and of fuels. To fight these Italy must stop the use of her natural fuel reserves (which are hardly ten per cent. of the national need). A vigorous movement has been made by the state in this direction by forming at the Politecino di Milano a special session for the study of combustion chemistry. The development of the electro-chemical industry must be encouraged. This is handicapped by the fact that the Italian water power, developed with the expenditure of much energy and research, is not abundant and is a costly proposition. The electrical energy which is produced finds naturally a greater remuneration in light and motor power. To develop the electro-chemical industry, according to Dr. Morselli, the state as proprietor of the water works must raise taxes and make laws, doing all in its power to favor the chemical industry.

The scarcity of raw materials is not an insurmountable obstacle in the face of a strong chemical industry. This is shown by the artificial silk and dye industries. It is natural, moreover, that a country poor in raw materials should turn to the chemical industry rather than any other, because chemical enterprise is more or less one of enhancing material form, converting materials of little value into materials of greatest value. So the national economy must be to discourage imports of costly finished products and to promote the use of crude materials of little value.

In conclusion, we trust that the revaluation of our currency will end by producing benefits to the Italian chemical industry, forcing it to revise and perfect its laboratory methods, reduce costs and improve the quality of its products. No industry is so completely technical as the chemical industry; and in no other does scientific research and intelligent direction play so great a part. From this point of view the Italian industrial conscience is still in the process of formation, but we see evidence of a comforting awakening. To be convinced one need only note the place given to chemistry and its teachings in the new Instituti Universitarii e Politecnici della Citta de Milano, which we consider the only one of its kind in Europe. Above all, Italy awaits an aid for her chemical industry through the Scuole de Chimica Industriale and its research laboratory.

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Continous Thickening In Chemical Industry

(*Continued from page 173*)

free from solution before they are discharged from the plant. Continuous Counter-Current Decantation is the name given to this improved method of washing, a method which is no less applicable to chemical processing than to the washing of metallurgical pulps. Reduced to its simplest form, counter-current decantation is a continuous method for bringing the settled solids into contact successively with weaker and weaker wash solution. Each wash is followed by settlement of the solids in a thickener so that the bulk of that particular wash solution may be eliminated before the solids are washed further with a weaker solution. As the solids are pumped successively through the various thickeners which make up the washing plant, they are mixed with and settled from weaker and weaker solutions and are accordingly impoverished in dissolved values. Similarly all the wash water is added in the last thickener in the series and overflows continuously into and out of the preceding units, coming in contact with sludges containing progressively larger amounts of dissolved values. In this manner the wash water is consistently enriched in solubles, almost all of which are finally made available in fairly concentrated form in the wash water after it has passed through the series. As this wash water returns to the head end of the plant and enters the precipitation, leaching or dissolving agitators, it subsequently passes out of the continuous decantation plant as the finished liquor overflow from the first thickener. The counter current principle is a well known one, and is practiced not only in chemical washing but also in drying, the hot gases passing in the opposite direction to the solids; in the scrubbing of gases with water, the water entering the top of the scrubber and the gas at the bottom; and many other operations.

Continuous counter-current decantation plants universally use the straight sedimentation thickener. One operator can easily look after an entire series of thickeners in such a plant, as with continuous operation and a uniform flow of material throughout the system the human element is practically non-existent. It is common in large plants of this type to find one man attending to as many as a dozen or more thickeners, the cost of operation of each thickener including labor, power, maintenance and fixed charges under favorable conditions and with large tonnages ranging from ¾c to 1¼c per ton of solids handled.

Counter-current decantation has given excellent results in the manufacture of the following chemical products.

Aluminum Sulfate—by the digestion of bauxite ore with sulfuric acid.

Caustic Soda—by the causticizing of soda ash with lime.

Phosphoric Acid—by the digestion of phosphate rock with sulfuric acid.

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Sodium Sulfide—by leaching sodium sulfide cinder with water.

Barium Sulfate—precipitated by mixing barium sulfide and sodium sulfate solutions.

Barium Carbonate—precipitated by mixing barium sulfide and sodium carbonate solutions.

Zinc Sulfate—by digesting zinc oxide ore with sulfuric acid.

Lithopone—precipitated by mixing barium sulfide and zinc sulfate solutions.

It will be appreciated that each of the products cited have this in common in their manufacture. If recovered from solutions as in the case of aluminum sulfate, caustic soda, phosphoric acid, barium sulfide and zinc sulfate these solutions immediately following their formation, contained insoluble residues or precipitates, which must be settled out and throughly washed for the recovery of the valuable solution entrained in them. If, on the other hand, the products are precipitates as in the case of barium sulfate, barium carbonate and lithopone, these precipitates before final drying must be washed free from all traces of the solution in which the precipitation took place in order to meet the accepted standards of purity.

The Phosphoric Acid Process

The manufacture of phosphoric acid may serve as a suitable example of continuous thickening and counter-current decantation in the preparation of a chemical product because in this case both the acid and the residue from its formation are products of value. The precipitate formed in its manufacture is calcium sulfate or gypsum which, when washed free from the acid, is an ideal material for the manufacture of gypsum blocks, plaster board and similar building materials. By tracing through the operation of a series of five thickeners and three continuous agitators at such a plant, it will be understood how a clear strong acid and a well washed precipitate may be produced on a continuous basis, accompanied by none of those manual operations, such as filling, decanting and emptying tanks, to complicate the handling or interfere with the much-desired continuity of operation.

Phosphoric acid is manufactured by digesting pulverized phosphate rock with sulfuric acid. The reaction is expressed chemically by the following equation.

$$Ca_3(PO_4)_2 + 3H_2SO_4 + H_2O = 3CaSO_4 * 2H_2O + 2H_3PO_4$$

phosphate sulfuric water calcium sul- phosphoric
acid rock acid fate (gypsum)

The digestion is carried out on a continuous basis by feeding the pulverized rock and acid to the first of three agitators by accurate ore and acid feeders and adding the proper amount of weak wash liquor to bring the solution to the required strength. The three agitators are arranged on slightly different

(*Continued on page 236*)

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Corporation Tax Returns of Chemical Business

(*Continued from page 163*)

Let us now pass on, logically, to the dividend record. In 1923, 381 million dollars in cash dividends, and $32,914,392 in stock dividends were paid; the successful corporations paying 342 millions of this cash dividend payment. In 1924, the cash dividends were 342 millions, 335 of which were paid by the successful corporations. In 1925 there were 472 millions in cash dividends distributed, and 28 millions in stock dividends. Thus the dividends paid in the chemical field have increased in two years about one-fourth.

Making now some vital percentage comparisons, we find that the gross profit from sales in 1923 in the chemical industry was 27.1%, which by 1925 declined to 26.8%. This is particularly significant, as gross profit on sales in all manufacturing declined from 26.1% in 1923 to the startling level of 20.6% in 1925; a reduction far more marked in other fields than in the chemical field.

"Cost of goods sold" (operating expense) in the chemical field in 1923 was 67.2%; which by 1925 had been reduced to 63.8%; another interesting achievement for the chemical industry, since the reduction attained in the general manufacturing field was only 2% as against 3.4% decrease in the chemical field.

Chemical Profits Compare Favorably

The rate of net profit, (after taxes) calculated on total receipts, in the chemical field, was 7.39%, in 1923, as against 6% in the manufacturing field. In 1925 this had been raised to 8.9%, as against an actual decrease in the general manufacturing field to 5.8%. Here again is shown the remarkable vitality of the chemical industry, going up when general business is going down.

The average volume of profit per successful corporation in the chemical field in 1925 was $157,751, and the average volume of deficit per unsuccessful firm was $27,350. The average dividend paid per successful firm was $71,881. The percentage of firms making $10,000 or more profit in 1925 was 42.6%.

Finally, the status of the entire industry, measured on a plus or minus basis of profit balance in 1925 as compared with 1920, was 56.8% as against a 29.7% for all corporations in American business.

There is an abundance of other material which can be dug out of the corporation returns, and I propose to provide more in a second article on the subject next month.

Compagnie de Bethune, France, produces 5,149 metric tons synthetic ammonia, by G. Claude processes during the period June 1, 1926 to June 30, 1927. Most of this was sulfurated to obtain 19,800 tons of sulfate of ammonia as compared with 13,737 tons during preceding year. The company is installing new plant which is expected to double production.

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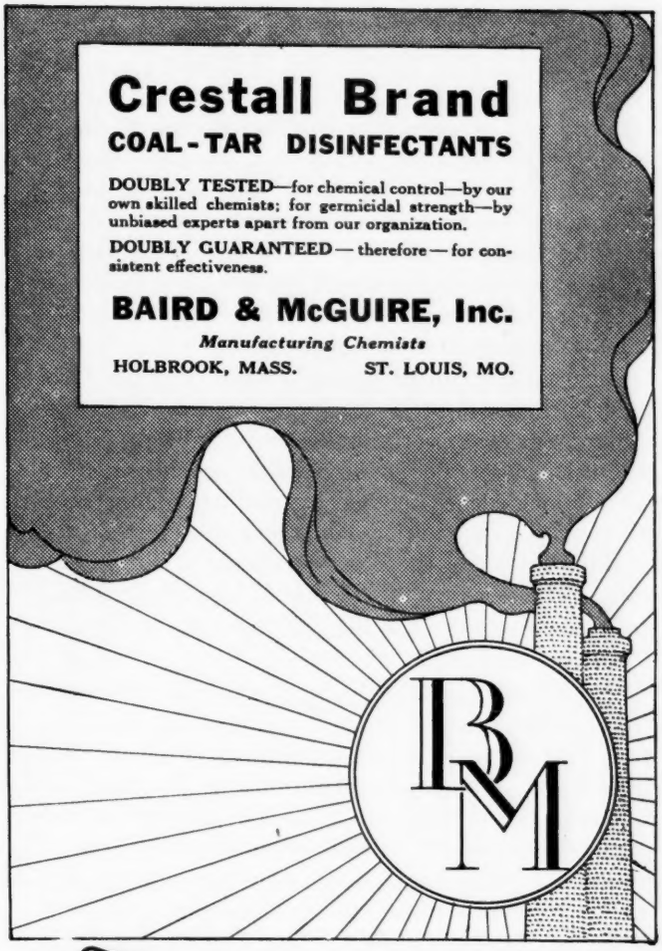

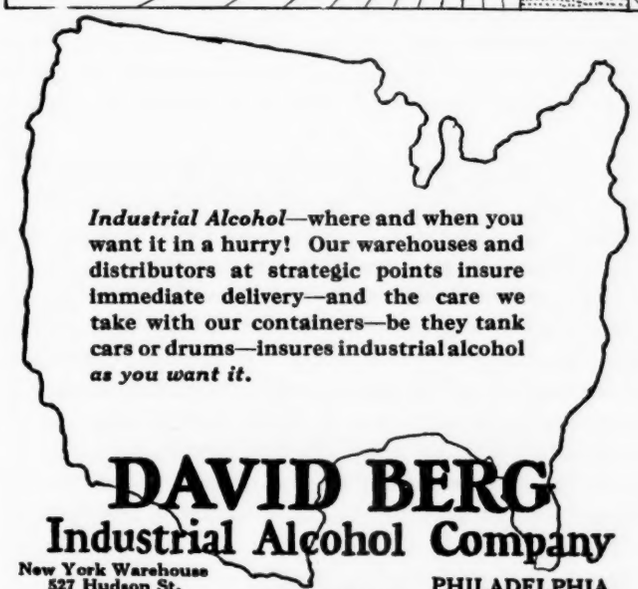

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Continuous Thickening in Chemical Industry

(*Continued from page 232*)

elevation so that the material passes through them by gravity and is given the required period of contact to assure a commercial degree of completion of the reaction. The discharge from the last agitator is accordingly a mixture of phosphoric acid and suspended calcium sulfate or gypsum. This mixture flows by gravity to the first of the five Dorr Thickeners which are arranged in series and constitute the continuous decantation part of the plant.

The calcium sulfate settles to the bottom of this first thickener, while a clear phosphoric acid overflows to storage. The precipitate is moved to the center of the thickener tank by the mechanism and removed, as a thick dense sludge by a diaphragm pump. Obviously, the solution contained in this sludge is phosphoric acid, the loss of which would greatly reduce the recovery of acid, while its presence in the precipitate would make this product entirely unsuited for commercial purposes.

Consequently, counter-current washing is resorted to, the sludge being pumped, through the remainng four thickeners toward the one end of the plant, while fresh wash water is introduced into the last thickener from which it overflows and cascades through the rest of the thickeners on its way toward the other end of plant in a direction opposite the precipitate. The solution strength in the various thickeners range from 30°Be in No. 1 to O°Be in No. 5, the finally discharged precipitate is virtually free from acid, and the enriched wash water is all utilized as a dilutant in the three agitators where fresh rock is being digested with acid.

Practically all of the phosphoric acid plants built within the last ten years have employed continuous methods of manufacture such as briefly described in this article. It has been found in practice that the continuous decantation plant can send on to subsequent processing a hotter, more concentrated acid than the old type batch plant. It can be operated with attention of only a supervisory nature as distinguished from manual, and shows marked improvements in utilizing the wash water to the fullest extent, in producing an acid and washed gypsum of uniform quality and in keeping unknown chemical losses at a very low figure.

In conclusion it can be said that continuous thickening is a unit process which has been the subject of enough careful, scientific study to be reduced to an exact science. Field and laboratory test results can be interpreted by those conversant with the subject with great accuracy. Our experience has, however, emphasized the value of studying each industry's need separately and with an open, unbiased minds In making such independent investigations it has become a part of our policy to accept no method. because they have always been used and at the same time reject none because they have never been tried.

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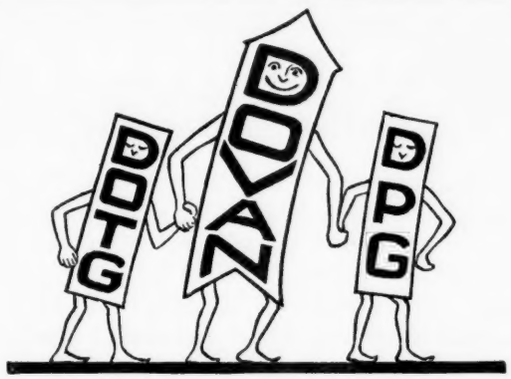

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Why Safety Pays

(*Continued from page 160*)

Imagination as a stallion-mounted knight, tireless champion of experimental research and scientific endeavor, leading ever on through assumption and hypothesis to final solution of problems scientific and humanistic. It is *really* imagination which we so frequently call to our aid in safety activities. We *imagine* or visualize what will be the psychologic effect of a given poster; we *imagine* possible care-

lessness on the part of operatives and try to make machines fool-proof; we *imagine* possible accidents and adopt means to prevent them. Often our imagination is not good enough, we fail to foresee possible consequences, an accident happens, we learn by bitter experience, but again we must *imagine* or visualize a prevention for that accident, as was done in the case above described. Always, it seems, somewhere, somehow, the man with the imagination supplies the necessary punch and kick, through his ability to visualize, to foresee. Imagination, visualization, foresight—all these words convey the same fundamental idea, but the word Imagination brings out, through alliteration, its antithesis to Inertia, and *that* appeals to the imagination!

American Zinc, Lead and Smelting Company directors have approved a plan to increase the facilities of the company's plant at East St. Louis by an expenditure of $700,000. Most of the operations at the Hillsboro plant will be transferred there when the improvements have been made, but the zinc oxide plant at Hillsboro will be kept in reserve in the event of a breakdown at the Columbus (O.) plant. The sulfuric acid storage facilities at East St. Louis will be increased from 1,500 tons to 4,500 tons. No new financing is proposed.

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National Aniline & Chemical Co., Inc.
40 Rector Street, New York, N. Y.

NATIONAL N QUALITY

Traffic Problems

(*Continued from page 150*)

articles are involved, it is difficult to see how the proper solution can be had, excepting by a determination on the part of each individual to protect his own interests. This requires a careful study and showing of the facts in each individual case, when the various Classification Committees docket their proposals for specific changes. Events may mean that these questions will be here to be decided by the Interstate Commerce Commission, but in either case it is not too soon to consider the problem and its possibilities.

Returnable Empty Containers

The increased freight cost of handling returnable empty containers would be detrimental to all, and this problem is already being handled as one common to the entire industry, through some at least, of its duly organized bodies, such as the Chlorine Institute, the Compressed Gas Manufacturers Association and the Manufacturing Chemists' Association. The value of full co-operation, on the part of the individual, must not be under estimated.

Bags As Chemical Containers

(*Continued from page 154*)

condition. If the tops are cut or have holes in them their value is much less. To open a bag tied at the top with twine it is simply necessary to cut the twine without cutting the cloth. A bag tied with a wire tie can be opened by untwisting the wire by hand. A hand sewn bag is opened by cutting the twine and pulling it out. Bags sewn by machine can easily be opened as a chain stitch is used so that if the two ends of the twine are pulled the stitches will unravel readily.

New developments are constantly taking place in bag manufacturing. Entirely new types of bags, both large and small, are being put on the market. Some of these are in use now and others are in the developmental stages. Chemical manufacturers interested in keeping packaging efficiency up to a high standard and down to a low cost may well keep in touch with these improvements and developments.

Imports of coal-tar dyes into the United States during 1927 totaled 4,182,026 pounds, with an invoice value of $3,423,918, which represents a decrease of 491,170 pounds, or 11 per cent. in quantity and $679,383, or 17 per cent. in value as compared with 1926.

Receipts by classes included 156,141 pounds of synthetic aromatic chemicals valued at $193,583 in 1927, against 152,212 pounds valued at $191,232 in 1926; 1,983,465 pounds of medicinals, photographic developers, intermediates and other coal-tar chemicals valued at $811,900 against 1,576,314 pounds, valued at $704,486, and 26,038 pounds of color lakes valued at $15,775 against 20,722 pounds valued at $13,637.

Public Service Commission, Albany, approves 25 cents per 100 pounds reduction in freight rates of New York Central on sulfate of ammonia from Utica to points on Delaware & Hudson, Round Lake to Rouses Point inclusive.

Langmuir -- Perkin Medalist

(*Continued from page 184*)

laws that had never been known before and that most men do not yet understand. He gazed again and saw outlaw atoms co-operating with his electrons, so that he was able to add to the thermionic servants of the radio sphere accurately controlled groups of electrical helpers in the shape of gas ions, and thus he continually improved radio tubes.

Langmuir a Doer

Here lies the difference between the ancient and the modern seers or prophets. The modern prophet is a doer. No one can fix the best ratio between thinking and doing. The pure thinker is apt to think too much and the active man to be too active. Evidently that Mendelian law which determines mutations and produces increased strength by cross-breeding explains why a certain mixture of thinking and acting yields greatest product. I know of no one who seems to combine these two characteristics in better balanced ratio than Langmuir.

World's Zinc Stocks Shrink 900 Tons

Increasing chemical and metallurgical uses of zinc give growing importance to supplies of this metal, and although from the producers point of view the business of 1927 was unsatisfactory, nevertheless the growing consumption of pure zinc is a significant chemical sign.

World stocks, as of Jan. 1, 1928 are estimated by A. J. M. Sharpe, honorary foreign correspondent for the American Zinc Institute as 56,100 metric tons (2,204.6 lbs.) compared with 57,000 tons on Dec. 1, and with 43,000 tons on Jan. 1, 1927.

Year 1927—	*Jan. 1 '28*	*Dec. 1 '27*	*July 1 '27*	*Jan. 1 '27*
United States	37,000	35,700	39,871	19,800
Canada	2,400	2,500	2,600	3,200
Australia	x2,800	x2,600	2,800	2,400
Germany & Poland	6,100	6,700	6,800	9,500
Belgium	4,200	4,400	3,300	4,000
Great Britain	1,100	1,500	1,500	1,000
Scandinavia	200	200	200	200
Far East	600	600	500	500
Elsewhere	1,700	2,800	2,800	3,000
Total	56,100	57,000	60,371	43,600

x Including unsold shipments afloat.

Mr. Sharpe, in reviewing world conditions of zinc as at Jan. 21, says:

. "Complete figures are not available at time of dictation of these notes, so that our preliminary estimate of 1,320,900 metric tons as world production for last year may need slight revision later. Now, having regard to the fact that such a production is a world record, it is almost unbelievable to those not in the trade to learn that the zinc industry did not enjoy a year of prosperity especially as consumption was likewise a record and world stocks of the metal fairly modest.

"True, there was and still is a disposition to slightly overproduce zinc, too, and the portents are that in 1928 another output record will be achieved. Still, with industrial affairs progressing satisfactorily in the Old World and the promise of no retrograde movement in trade in the United States, consumption this year should also break record. In brief, there is scope, in our opinion, for a fair advance in the zinc market this year; indeed, we regard the current quotations of 5.65c. per pound in St. Louis and 26 2s. 6d. per long ton in London as substantially below the intrinsic value or what should be the basic price for prime Western at the present time."

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Will sell interest in successful chemical manufacturing plant; about $15,000.00 required. Chemist with manufacturing experience preferred but not essential. Box 778 Chemical Markets.

FOR SALE—former chemical plant; three story brick building with one story extension and two one-story buildings containing total of about 24,000 square feet of floor space, also three four-family frame and one single family frame building for workmen on eleven acre property; railroad siding, water power developing 25 to 40 Horse Power, electrical elevator, steam engine, boilers, state highway. About 100 miles from New York, good transportation and labor conditions. Very reasonable. Write Herbert McKennis, 2 Rector Street, New York City.

CHINA CLAY COMPANY, now operating best located large deposit in South desires capital for expansion. Will sell outright or controlling or part interest. Box 765 CHEMICAL MARKETS.

ESTABLISHED CHEMICAL MANUFACTURING CONCERN with excess equipment available will consider purchase suitable processes or will manufacture on mutually profitable arrangement. Box 760 CHEMICAL MARKETS.

Situation Wanted

CHEMICAL ENGINEER experienced in research and in design and operation of aniline color plants, desires position. Box 766 CHEMICAL MARKETS.

PLANT EXECUTIVE Chemical Engineer, eighteen years experience, including organic and inorganic research, production and executive positions. Excellent record of accomplishment in development of methods and processes, cost reduction and securing willing co-operation of associates. Have reached limit of growth with present connection and am therefore anxious to make change, available on short notice. Box 772 CHEMICAL MARKETS.

CHEMIST B. A., 41, married, 20 years experience in the manufacture and standardization of Pharmaceuticals, flavoring extracts, organics, buying, plant operation. Six years in present position. Desires to make a change. No objection to out of town position. Box 771 CHEMICAL MARKETS.

CHEMICAL ENGINEER, 38 years, with 18 years experience in laboratory research, plant work, organic, fertilizer and heavy chemicals, desires to change position. Box 773 Chemical Markets.

PHARMACEUTICAL CHEMIST and Factory Manager of long experience in manufacture of Medicinal and Toilet preparations desires position with reliable firm. Box 776 Chemical Markets.

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SALESMAN with considerable experience and established clientele to cover entire New England territory for well known chemical house. Splendid opportunity for right man to make permanent connection. Box 774 Chemical Markets.

SALESMEN with following among glycerin consumers wanted. An interesting proposition will be presented to the proper men. Advertiser just commencing operations in this field. Reply fully stating experience in confidence. Box 763, CHEMICAL MARKETS.

SALESMEN—for New York City and representatives for other cities for products going to following industries; toilet preparations, textiles, patent-medicine, flavoring extracts, tobacco, inks, garages, etc. To men with following in any of the above lines in attractive proposition is waiting. Box 767, CHEMICAL MARKETS.

WANTED—Thoroughy experienced plant executive for production of aniline azo dyes and intermediates on a large scale. Permanent connection with opportunity for development. Submit qualifications as well as previous experience, as well as salary wanted. All replies treated in absolute confidence. Box 729, CHEMICAL MARKETS.

WANTED—Chemist with experience in laboratory research and plant work, essential oils. Good opportunity for right man. Box 769, CHEMICAL MARKETS.

A prominent manufacturer desires to get in touch with an engineer or chemist who is familiar with the process of subliming Iodine. Box 718, CHEMICAL MARKETS.

Raw Materials

Several 1,000 Kg. Succinic Acid (Bernsteinsaure) to be sold. Ed. Pfannenschmidt A. G. Danzig-Schellmuhl Amber Varnish Works founded in 1861.

ROSIN—wanted, raw grade, packed in barrels-send samples and quotations. Address John D. Roupas, Patras, Greece—Cables, Roupas Patras A. B. C. 5th Edition.

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Miscellaneous

WANTED—CHEMICAL MARKETS, Vol. 19, No. 4, 8, 10, 12, 16, 18, 20, 22, 24, 26, 28, 30, 32, 1926 issues. Library of Congress, Washington, D. C.

ANALYTICAL balance accurate to one-tenth milligram with weights. State make, condition and price. Box 777 Chemical Markets.

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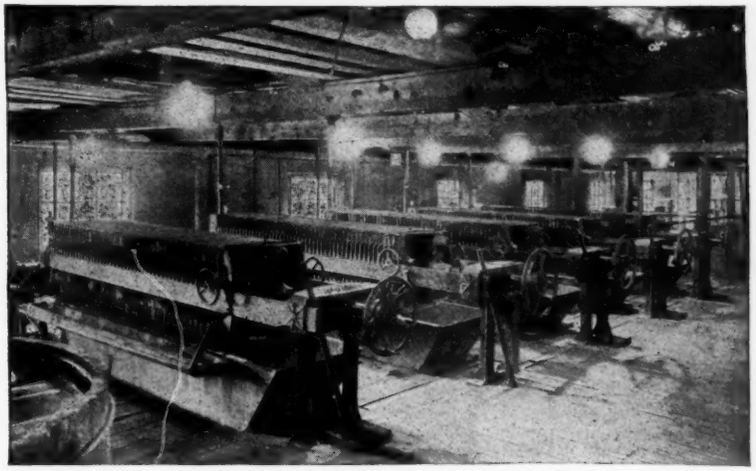

Above you see a battery of Shriver Filter Presses in the plant of the Imperial Color Works, Glens Falls, New York. This company has chosen the Shriver way to filter its chemical pigment colors for a reason that will appeal to every manufacturer---because Shriver Filter Presses consistently give better results at less cost.

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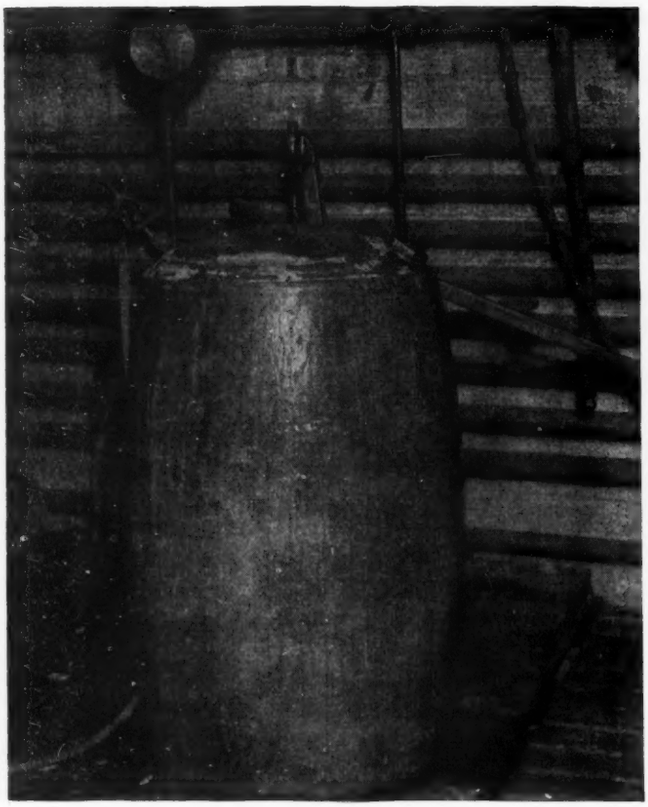

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"WE"—Editorially Speaking

An inquiring reporter asked HARRY M. MABEY what effect the new I. C. C. regulations would have on shipping costs.

"Oh! I didn't know the regulations had been issued—have you a copy of them with you ?"

"Why-er-well, no. I guess they haven't been finally decided on yet."

"Then, my boy, you might just as well ask me whether or not I thought it would rain or snow next St. Valentine's Day."

That answer is thoroughly typical of the man who wrote a study of the fundamentals of chemical traffic rate-making (published, by the way, in CHEMICAL MARKETS) which in Washington, among traffic officials and everywhere among traffic managers is recognized as a classic for the clarity of its exposition and the sanity of its conclusions. We had no easy task persuading so busy and conscientous an authority to review the new and very notable developments in freight rates for this issue in which are considered various angles of the rapidly changing problem of chemical shipping. Mr. Mabey is no book-taught theorist. As traffic manager of the Mathieson Alkali Works, he handles caustic in carlots, bicarbonate by the keg, ammonia in tanks, chlorine in cylinders, and coumarin in five-pound tins—all in the day's routine.

There is one thing that an income tax return may be counted upon to furnish when used as source material for economic statistics. It gives the lowest possible net figure of any enterprise's profits. No corporation willingly pays taxes on profits it didn't make—hence, the sound suggestion of a banker that the fairest appraisal value in effecting a consolidation agreement would be upon the basis of net worth determined by tax returns. In like manner that shrewd business analyst, J. GEORGE FREDERICK, has worked out comparisons between the chemical group and other American industries, the results of which will come as a surprise to those who have been listening to the wails of the profitless prosperity howler.

Speaking of which leads naturally to one of the root causes of extra-success in chemical process manufacture. In chemical operations, based on chemical reactions, yields vary, introducing thus a competitive advantage at the very core of production costs. Any factor, therefore, that touches yields is of vital concern to management and nothing so crucially affects yields as does chemical control. The capital authority on this subject is Dr. W. A. TAYLOR of the LaMotte Chemical Products Company, whose great modesty was violently wrenched when we suggested that a footnote giving credit for the research work done by many good chemists on the practical uses of pH control was out of place in this business magazine of chemistry. Having perfected the apparatus for pH determinations, he has skillfully accomplished the difficult feat of explaining its meaning and usefulness in non-technical language.

HOMER V. HOWES has a hobby in finding new uses for bags—cotton, paper, burlap; plain or fancy; sift-proof, dirt-proof, water-proof. He has even worked out a bag for carrying gasoline from the pump to the stranded gas-less motorist. It works, too, and sold by the thousand. There is more than one suggestive thought in his article on this subject.

One of the salient features of the Chemical Revolution is the tremendous expansion in the use of gases—the double meaning is quite forgivable in this case—and the resulting changes in the transportation situation is a timely topic of consideration. From behind the scenes L. A. BELDING writes a most suggestive description on the work done to develop safe and economical containers to handle this new type of business, work that must keep pace with the chemists' advances in catalysts and the engineers' improvements in high pressure apparatus, if the use of these gases is to come into the workaday world of industry and commerce.

In a single delivery the postman brought us this morning two vivid descriptions of CHEMICAL MARKETS in its new form and monthly issue—(1) "a nobly conceived and splendidly executed economic review for the busy chemical executive," and (2) "a whiz-bang!" No, you're wrong—the second was from the Chairman of the Board of one of the biggest companies in the industry.

Our mail basket is the most fascinating item of a life that, whatever may be said against it, assuredly does not lack variety or interest. It is a Jack Horner's pie from which we seldom fail to draw some rich and luscious plum at every helping the Post Office serves us. There is always a good solid cornmeal filling of government reports, news notes, begging letters and circulars offering everything from second-hand filter paper to gilt-edge bonds (the tactful assumption on the part of so many of our correspondents that an editor has quantities of spare cash is most flattering). But larded in between are rare bits of propaganda and poetry, wrathful comment, radical criticism, and righteous correction. A certain sales manager in Cleveland takes unholy delight in pointing the finger of scorn at our slightest slip, while a vice-president up on Lexington Avenue pokes fun at our best, most serious efforts. Good friends both—and we have often been truly appreciative of their chastisements. By and large, we receive more complaints than compliments—which is good for our immortal soul if not our infernal temper—and so we are most especially grateful to the many readers who have been courteous enough to write us that they like our new appearance and approve our broadened policy. We are not fishing for sugarplums: we do want our readers to comment frankly on both editorials and articles, and we cordially invite such correspondence. Some of the choicest bits from our mailbaskets, since our January issue appeared, have been discussions of the editorial entitled "Forty Per Cent." Next month we shall share with all our subscribers pertinent extracts from a score of these letters—a symposium from both production and sales executives on the whys and wherefores of new products.

Coming In March

No branch of chemical industry is facing more drastic changes than fertilizers, where changes in raw materials and practice, promise to transform the manufacturer from a compounder into a chemical operator. These revolutionary changes are the subject of a notable group of special articles in next month's issue:

Charles H. MacDowell, president, Armour Fertilizer Works on The Economics of High Test Fertilizers.

John J. Watson, president of International Agricultural Chemical Co., on Fertilizer Finances.

Sidney Haskell, formerly director of Massachusetts Experiment Station and now agronomist for the Synthetic Nitrogen products Co.—(American subsidiary of the I. G.) on New Chemical Fertilizers.

H. D. Ruhm, of the Ruhm Phosphate Co., on What Ails the Fertilizer Industry ?

Pyrites by Agustus Ledoux.

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